Baskarp Sand No. 15

data report 9403

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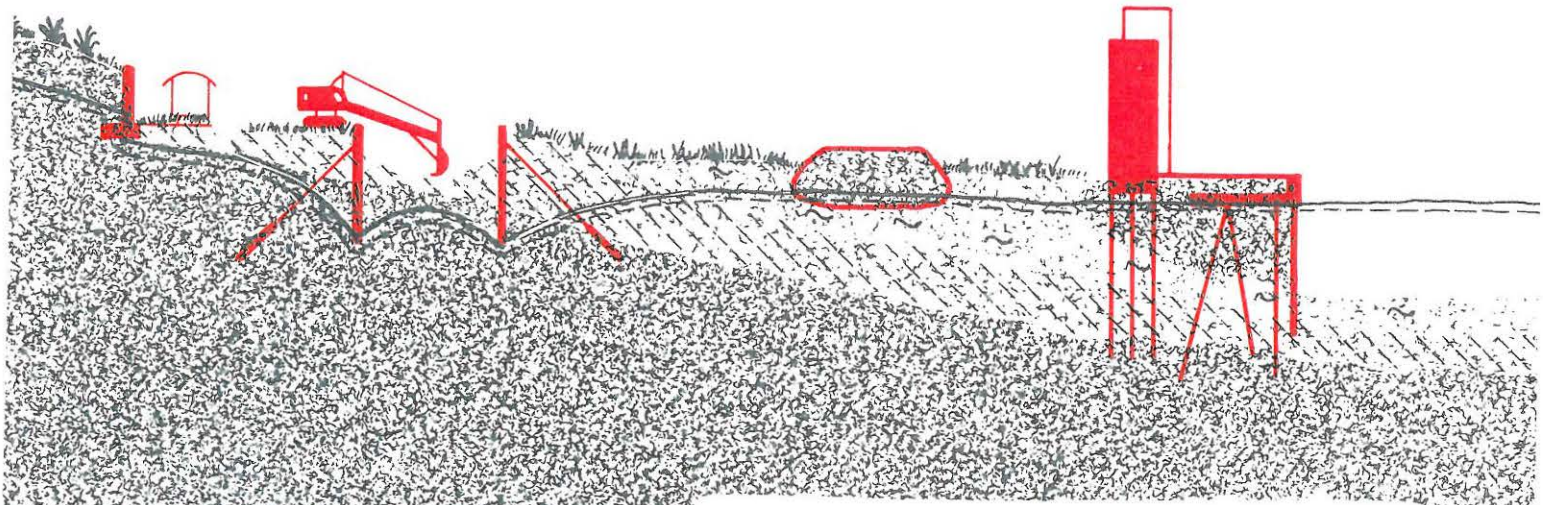

DATA REPORT 9403

Baskarp Sand No 15

Marianne Borup & Jette Hedegaard
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LIST OF SYMBOLS

d	diameter of grain
d_{10}	10% fractile
d_{50}	50% fractile
d_{60}	60% fractile
d_s	grain density
e	void ratio
e_0	void ratio before test
e_f	void ratio at failure
e_{max}	maximum void ratio
e_{min}	minimum void ratio
I_D	density index
p'	effective mean stress$=1/3(\sigma'_1+2\sigma'_3)$
q	deviator stress$=\sigma'_1-\sigma'_3$
S_w	degree of saturation
ε	strain
ε_1	vertical strain
ε_v	volumetric strain$=\varepsilon_1+2\varepsilon_3$
ε_q	deviatoric strain$=2/3(\varepsilon_1-\varepsilon_3)$
σ'	effective stress
σ'_1	effective vertical stress
σ'_3	effective cell-pressure
ν	Poisson's ratio$=(\Delta\varepsilon_1-\Delta\varepsilon_v)/(2\Delta\varepsilon_1)$
ψ	angle of dilatation$=\sin^{-1}(\Delta\varepsilon_v/(\Delta\varepsilon_v-2\Delta\varepsilon_1))$

INTRODUCTION

In connection with the Master Thesis 'Characteristic State Modelling on Friction Materials' drained triaxial tests have been carried out on Baskarp Sand No 15. This sand is a graded sand from Sweden and the shapes of the largest grains are round, while the small grains have sharp edges. The main part of Baskarp Sand is quarts, but it also contains feldspar and biotit. Tests have been performed with two different densities, corresponding to loose (I_D=0.01) and dense (I_D=0.80) sand and in the present data report the results are presented. In 1993 the Soil Mechanics Laboratory performed classification tests and triaxial tests on the sand and these results are presented in the Data Report 9301 by Ibsen & Bødker (1993).

CLASSIFICATION OF THE SAND

To classify the Baskarp Sand sieve tests have been performed. Further the grain density d_s and the maximum and minimum void ratios e_{max} and e_{min} have been determined. The following parameters have been estimated by Hedegaard & Borup (1993):

- d_{50} = 0.14 mm
- d_{60}/d_{10} = 1.78
- d_s = 2.64
- e_{max} = 0.854
- e_{min} = 0.549

In figure 1 the distribution of the grains is illustrated.

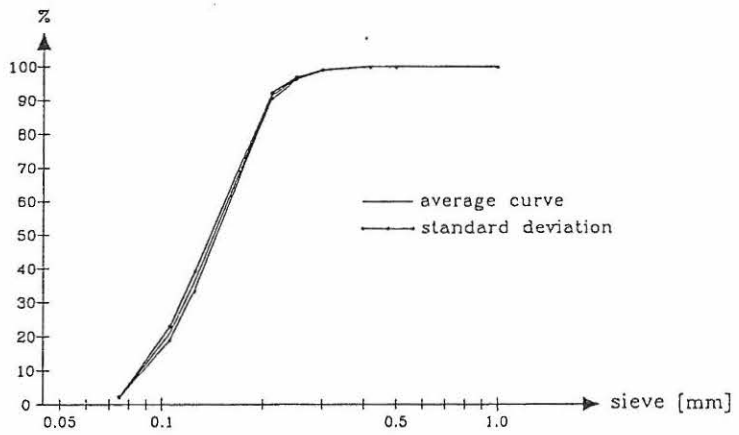


Figure 1 Results from sieve tests on Baskarp Sand No 15.

TRIAXIAL TESTS

The drained triaxial tests have been performed by using the Danish triaxial cell, which requires smooth pressure heads and specimens with height equal the diameter in order to obtain homogeneous stress/strain conditions. Three different types of tests have been performed and for these tests the following abbreviated designations will be used:

- CD-test - conventional compression test (σ'_3=const.)
- HC-test - hydrostatic compression test (q=0)
- DC-test - deviator compression test (q=const)

The CD-test is a conventional compression test where the stresses σ'_2 and σ'_3 are kept constant while the third principal stress σ'_1 is increased. If the mean stress p' and deviator stress q are introduced, the stress path for this test is constrained by $dq=3 \cdot dp'$. The tests are performed by following an initially hydrostatic stress path until a desired cell-pressure is reached. From this stress state the conventional compression path is followed until failure is reached. For the HC-tests the stress path remains along the hydrostatic axis, i.e. $\sigma'_1=\sigma'_2=\sigma'_3$. This means that the mean stress varies while the deviator stress is zero. When performing these tests the mean stress is gradually increased to a desired stress state and from this state the sand is unloaded. The last type of tests performed are the deviator compression tests. In this test the deviator stress is kept constant while the mean stress is decreased. The decreasing mean stress is obtained by reducing the cell-pressure gradually.

For each test the results are presented on two pages where the first page is used to state general data for the test such as the test program. On this page relevant values for the stresses (p' and q) and strains (ε_1 and ε_v) are also shown, and in cases where the failure and characteristic state are reached the values corresponding to these states are given. For CD-tests the variation of Poisson's ratio ν and the angle of dilatation ψ throughout the tests are shown as well. These parameters have been calculated from the vertical and volumetric strains using the formulas given in the list of symbols. On the second page the results are illustrated graphically in form of stress-strain curves and $(\varepsilon_1,\varepsilon_v)$-curves.

CD-tests

In the test series 9403 five CD-tests have been performed on loose sand (e=0.85) and two tests have been performed on dense sand (e=0.61). The cell-pressures used in the tests as well as the test-names are presented below.

cell pressure σ'_3 [kPa]	void ratio e	test-name
20	0.85	9403.01
160	0.85	9403.02
640	0.85	9403.03
800	0.85	9403.04
985	0.85	9403.07
100	0.61	9403.17
160	0.61	9403.12

Table 1 Data for CD-tests on loose and dense sand.

HC-tests

Two hydrostatic compression tests have been performed on loose sand, while three tests have been performed on dense sand. The name of these tests and the test conditions are shown in table 2. The values stated for the mean stress represents the limits between which p' has been varied throughout the tests.

mean stress p' [kPa]	void ratio e	test-name
20-900-170	0.85	9403.05
20-900-20	0.85	9403.10
100-320-200-640-400-800-100	0.61	9403.13
100-800-100	0.61	9403.14
100-800-100	0.61	9403.15

Table 2 Data for HC-tests on loose and dense sand

DC-tests

The deviator compression tests have only been performed on loose sand and in table 3 the deviator stress q and test name are presented.

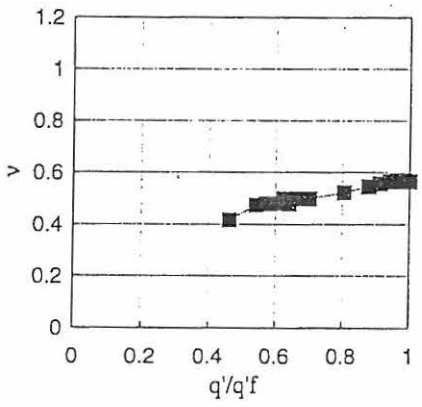
deviator stress q [kPa]	void ratio e	test-name
100	0.85	9403.08
300	0.85	9403.09
700	0.85	9403.11

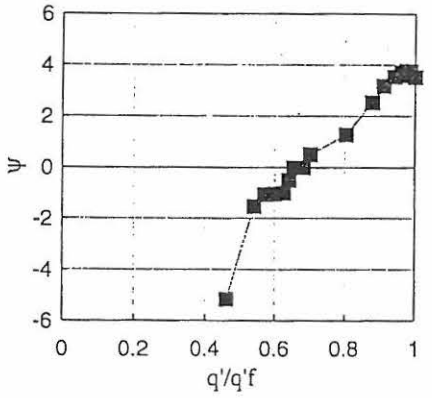
Table 3 Data for DC-tests on loose sand

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.842	0.872
		Saturation	1.01	
kal7	28-29.09.94	Dimension H mm	71.5	
		D mm	69.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-20 kPa
CD - Triaxial test.		ε 1	-0.101 %
free ends		ε v	-0.278 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

		Values at failure		Values for Δε v = 0	
Deviator stress	q'	63.98	kPa	44.89	kPa
Mean normal stress	p'	41.43	kPa	35.16	kPa
Confining pressures	σ3	20.10	kPa	20.20	kPa
Vertical strain	ε 1	15.84	%	1.34	%
Volumetric strain	ε v	-1.70	%	0.06	%

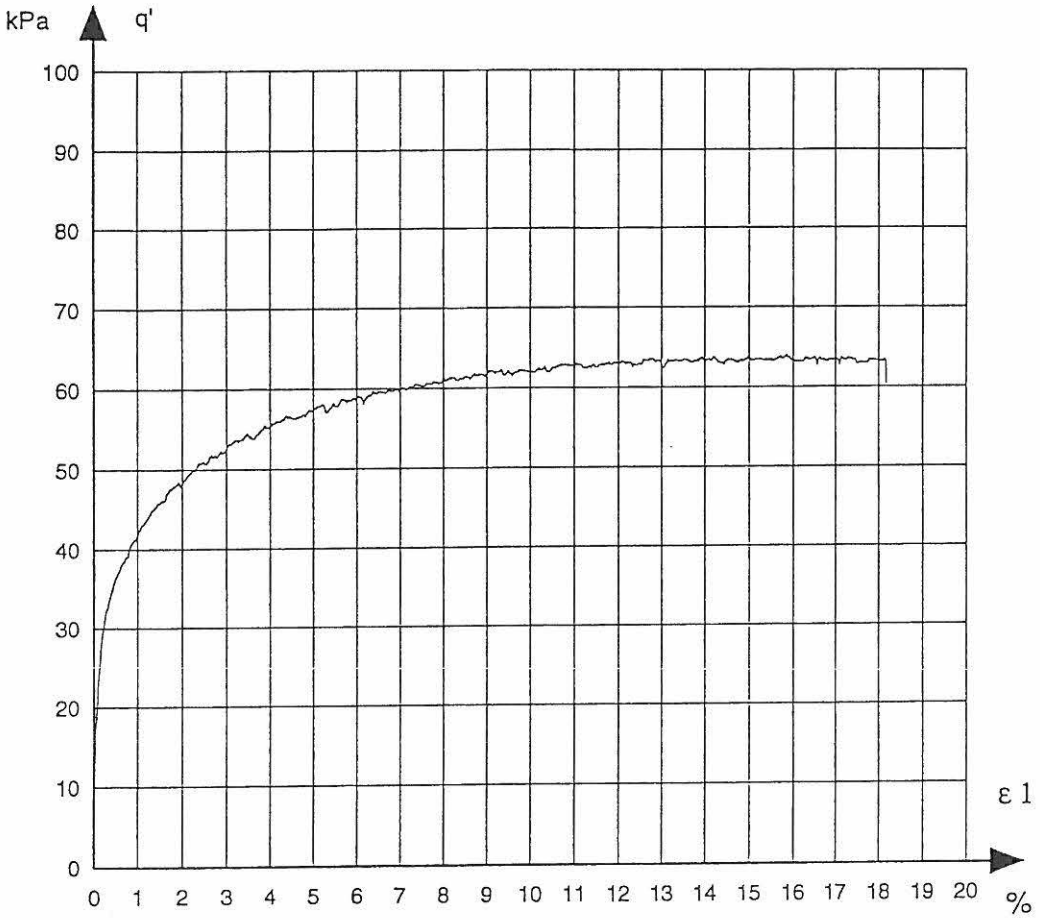


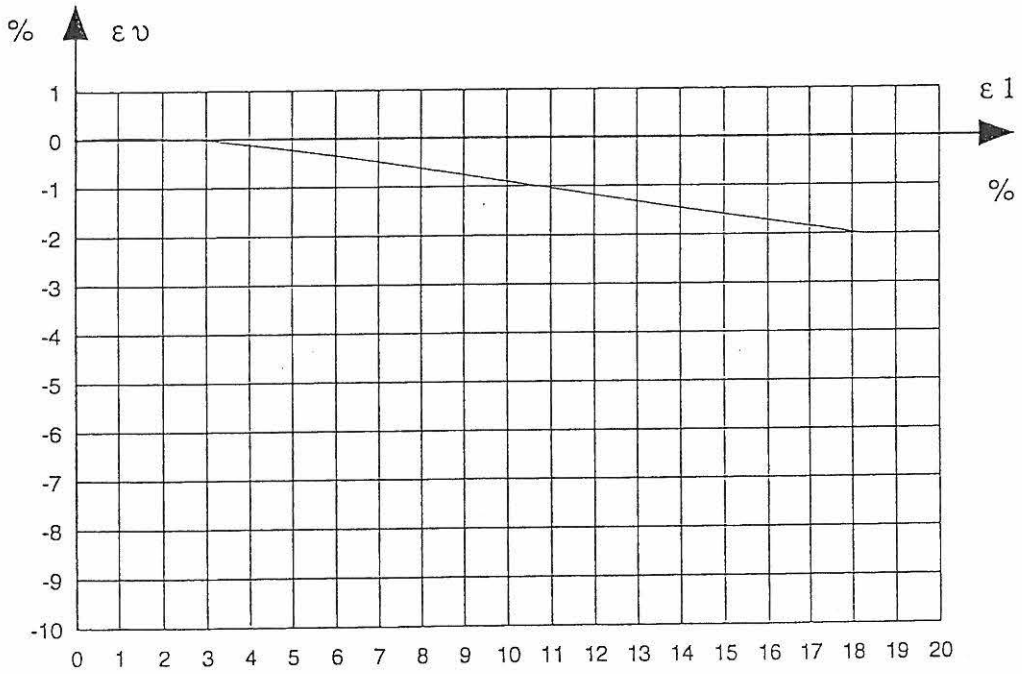


q'	p'	ε 1	ε v
1.95	20.75	0.00	0.00
29.51	29.94	0.20	0.03
34.63	31.64	0.41	0.04
36.53	32.28	0.51	0.05
37.47	32.59	0.60	0.05
38.40	32.90	0.70	0.05
39.97	33.42	0.81	0.05
40.90	33.73	0.90	0.06
41.82	34.04	1.00	0.06
43.07	34.46	1.10	0.06
43.66	34.65	1.21	0.06
44.89	35.16	1.34	0.06
51.46	37.25	2.79	-0.01
56.19	38.83	4.29	-0.15
58.26	39.52	5.79	-0.32
60.22	40.17	7.28	-0.52
61.49	40.60	8.76	-0.72
62.37	40.89	10.27	-0.94
62.92	41.07	11.75	-1.14
63.12	41.14	13.25	-1.35
62.99	41.10	14.75	-1.55
63.98	41.43	15.84	-1.70
63.12	41.14	16.24	-1.75
62.93	41.08	17.73	-1.93

Job: Baskarp No 15	Encl. No 1
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = 0.190



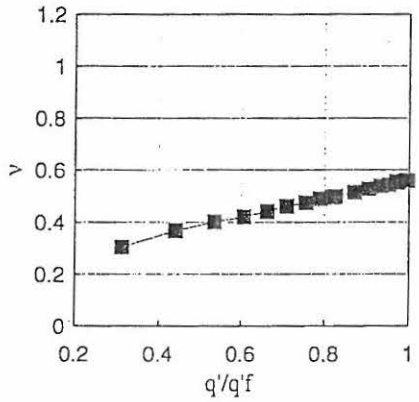


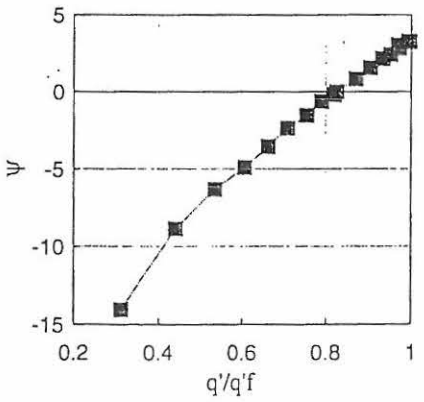
Job: Baskarp No 15	Encl. No 2
Exc: MB & JH	Check: MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.845	0.848
		Saturation	1.01	
kal7	29-30.09.94	Dimension H mm	71.5	
		D mm	69.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-160 kPa
CD - Triaxial test.		ε 1	0.053 %
free ends		ε ν	0.146 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	392.42	kPa	323.71	kPa
Mean normal stress	p'	291.11	kPa	268.20	kPa
Confining pressures	σ3	160.30	kPa	160.30	kPa
Vertical strain	ε 1	13.80	%	4.58	%
Volumetric strain	ε ν	-0.22	%	0.64	%

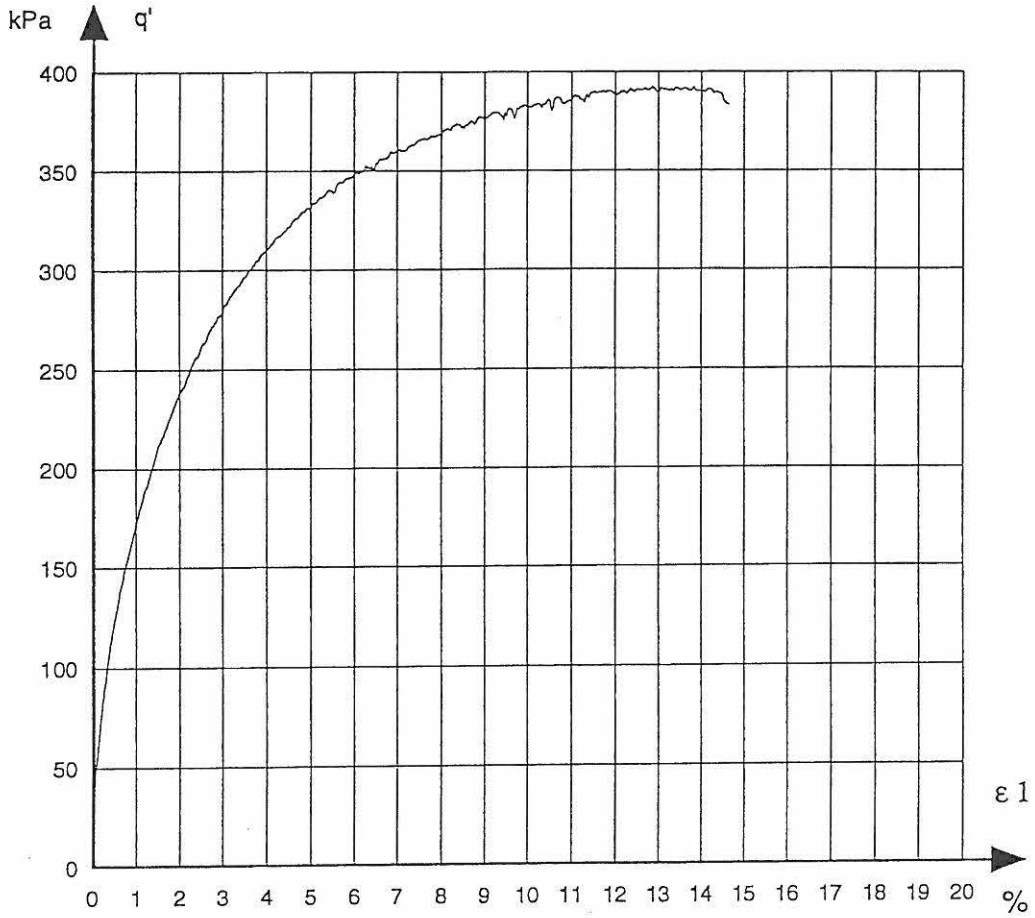


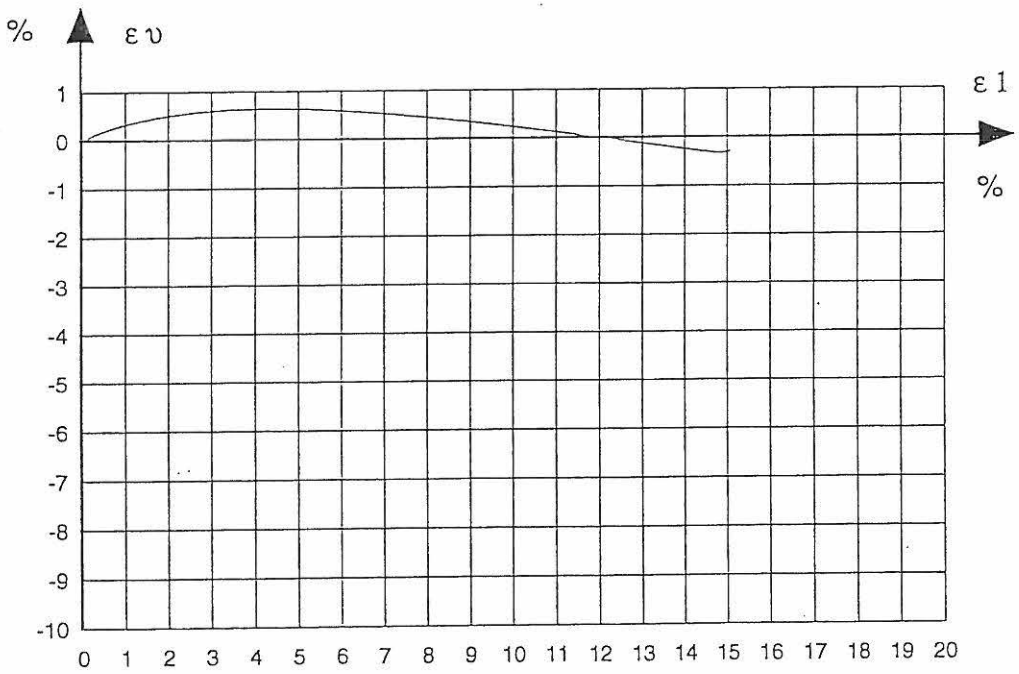


q'	p'	ε 1	ε ν
0.98	160.63	0.00	0.00
122.41	201.00	0.50	0.19
172.73	217.68	1.00	0.33
210.05	230.12	1.50	0.43
238.04	239.55	1.99	0.50
260.28	246.86	2.49	0.56
278.42	253.01	3.00	0.60
296.37	259.09	3.49	0.63
309.63	263.51	3.99	0.64
321.22	267.37	4.48	0.64
323.71	268.20	4.58	0.64
341.26	273.95	5.58	0.61
354.65	278.52	6.56	0.56
366.02	282.31	7.56	0.48
373.09	284.66	8.56	0.39
381.39	287.43	9.55	0.29
380.48	287.13	10.56	0.18
389.32	290.07	11.56	0.06
391.12	290.67	12.54	-0.06
392.42	291.11	13.80	-0.22
371.11	283.90	14.80	-0.33
346.73	275.88	14.88	-0.33
300.25	260.38	14.99	-0.31
301.08	260.46	15.09	-0.29

Job: Baskarp No 15	Encl. No 3
Exc: MB & JH	Check: MB & JH

Remark:
Preparation [%] Δ ε1 = 0.234



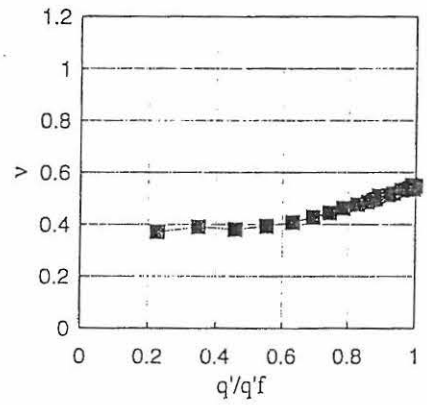


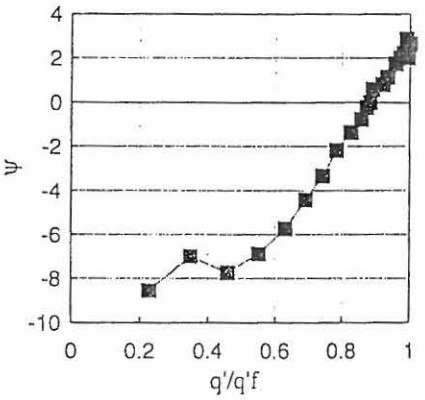
Job: Baskarp No 15	Encl. No 4
Exc: MB & JH	Check: MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.842	0.833
		Saturation·	1.01	
kal7	01-02.10.94	Dimension H mm	71.5	
		D mm	69.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-640 kPa
CD - Triaxial test.		ε 1	0.328 %
free ends		ε v	1.031 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

		Values at failure		Values for Δε v = 0	
Deviator stress	q'	1479.82	kPa	1306.80	kPa
Mean normal stress	p'	1133.17	kPa	1075.80	kPa
Confining pressures	σ3	639.90	kPa	640.20	kPa
Vertical strain	ε 1	16.38	%	7.84	%
Volumetric strain	ε v	0.46	%	1.06	%

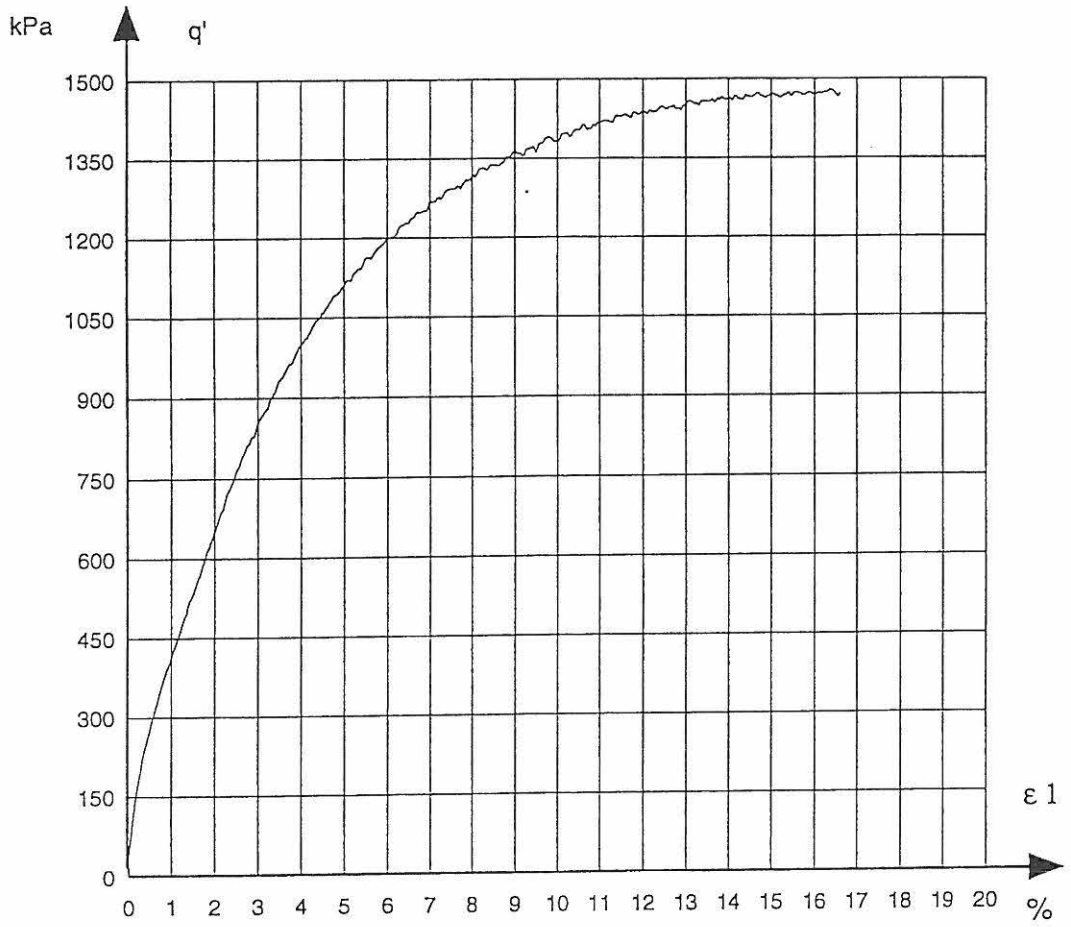


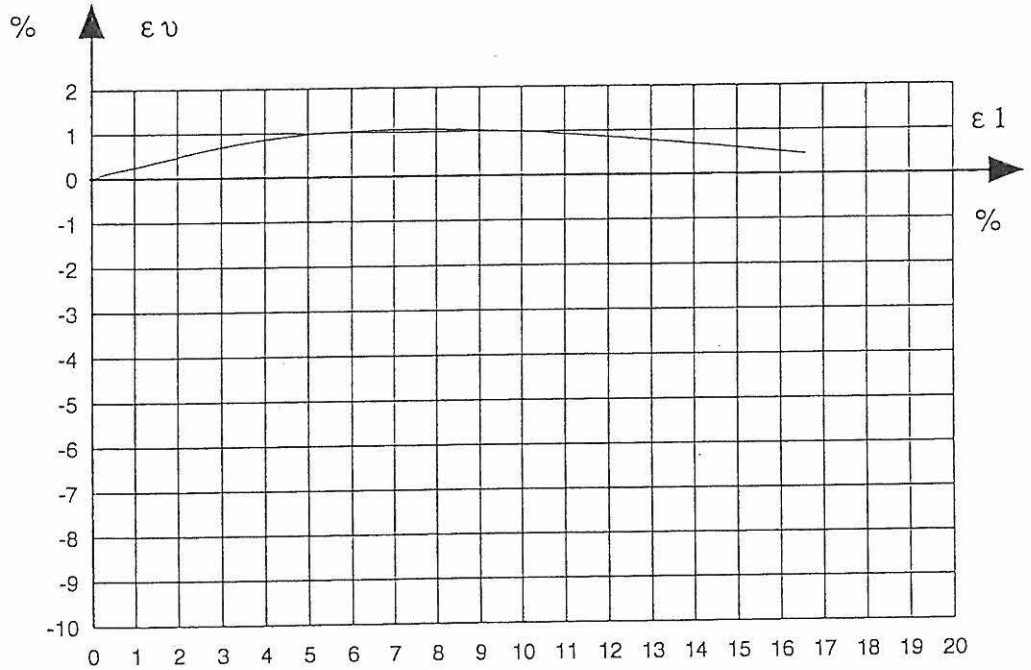


q'	p'	ε 1	ε v
1.64	640.85	0.00	0.00
336.06	750.62	0.71	0.18
513.49	803.06	1.40	0.33
676.68	865.76	2.11	0.50
814.52	911.41	2.81	0.65
931.54	950.41	3.49	0.77
1022.48	980.83	4.21	0.88
1098.86	1006.39	4.90	0.95
1160.36	1026.69	5.60	1.01
1223.38	1047.79	6.31	1.04
1268.78	1062.93	7.00	1.06
1291.75	1070.98	7.45	1.06
1306.80	1075.80	7.84	1.06
1318.25	1079.42	8.01	1.06
1362.62	1094.31	9.02	1.03
1381.99	1100.76	10.02	0.99
1418.26	1112.75	11.00	0.92
1437.98	1119.23	12.01	0.85
1452.90	1124.20	13.01	0.77
1463.66	1127.99	14.02	0.67
1471.30	1130.43	15.02	0.59
1479.82	1133.17	16.38	0.46
1471.77	1130.69	16.50	0.45
1473.35	1131.02	16.60	0.44

Job: Baskarp No 15	Encl. No 5
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = 0.256



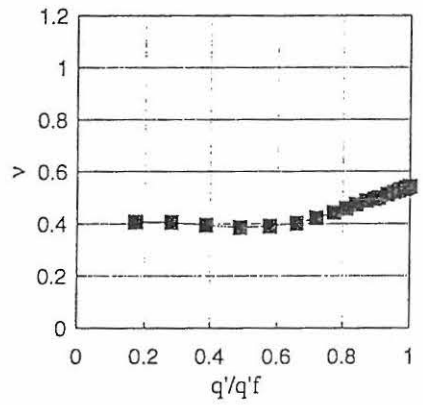


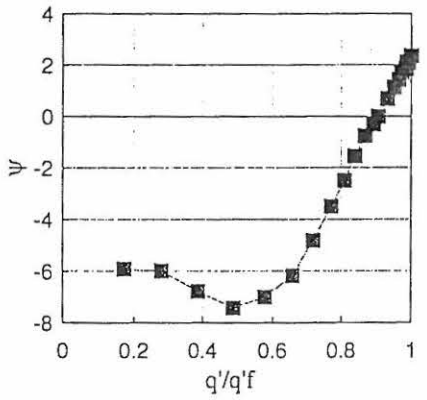
Job: Baskarp No 15	Encl. No 6
Exc:	Check:
MB & JH	MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.844	0.830
		Saturation	1.01	
kal7	02-03.10.94	Dimension H mm	71.5	
		D mm	69.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-800 kPa
CD - Triaxial test.		ε 1	0.335 %
free ends		ε ν	1.199 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	1814.49	kPa	1642.93	kPa
Mean normal stress	p'	1405.33	kPa	1348.04	kPa
Confining pressures	σ3	800.50	kPa	800.40	kPa
Vertical strain	ε 1	17.02	%	8.79	%
Volumetric strain	ε ν	0.68	%	1.17	%

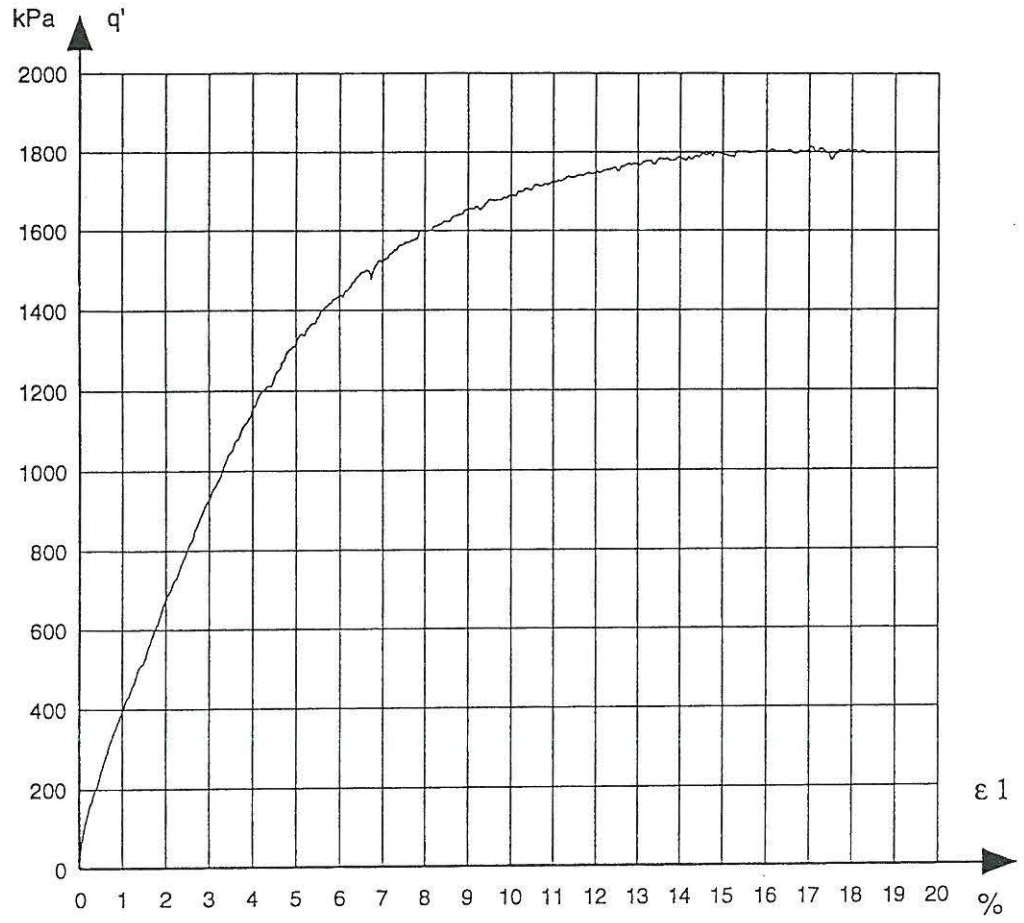


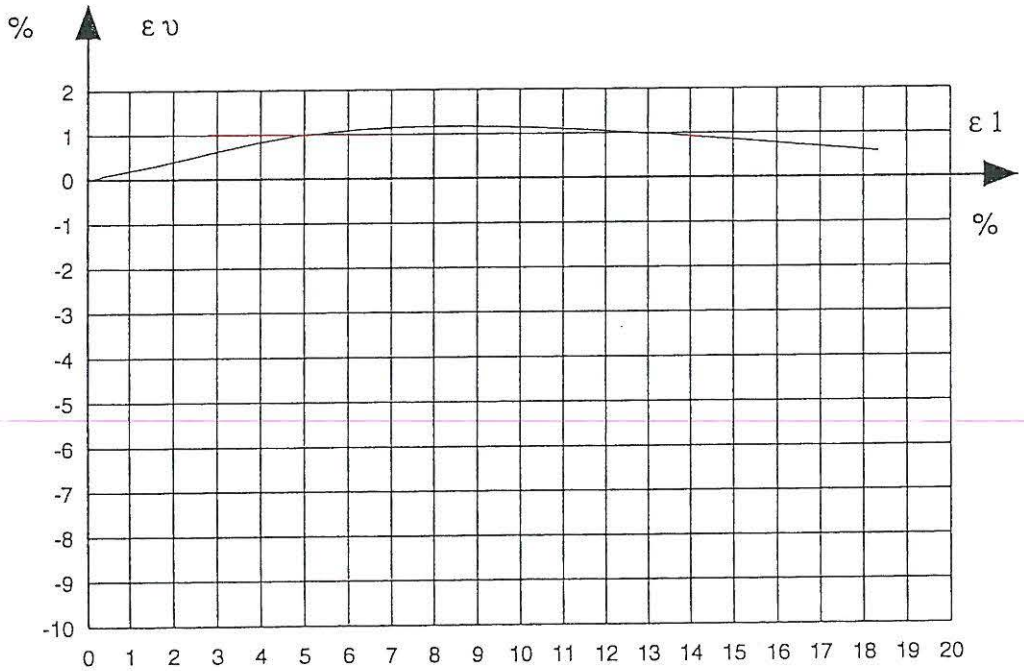


q'	p'	ε 1	ε ν
-0.33	800.19	-0.00	0.00
312.95	904.52	0.70	0.13
505.84	968.81	1.40	0.26
700.71	1033.87	2.11	0.41
884.27	1095.06	2.80	0.57
1046.99	1149.20	3.50	0.72
1195.31	1198.64	4.20	0.86
1304.38	1235.19	4.91	0.97
1400.37	1266.99	5.61	1.05
1468.20	1289.60	6.31	1.11
1523.25	1307.95	7.00	1.14
1576.69	1325.96	7.70	1.16
1619.61	1340.37	8.40	1.17
1642.93	1348.04	8.79	1.17
1691.53	1364.24	10.01	1.14
1726.40	1375.87	11.00	1.10
1750.41	1383.67	12.00	1.05
1765.57	1388.72	13.01	0.99
1787.12	1396.11	13.99	0.92
1795.14	1398.58	14.99	0.84
1799.17	1400.22	16.00	0.77
1814.49	1405.33	17.02	0.68
1783.19	1394.70	17.50	0.64
1803.94	1401.81	17.99	0.60

Job: Baskarp No 15	Encl. No 7
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = 0.217





Job: Baskarp No 15	Encl. No 8
Exc: MB & JH	Check: MB & JH

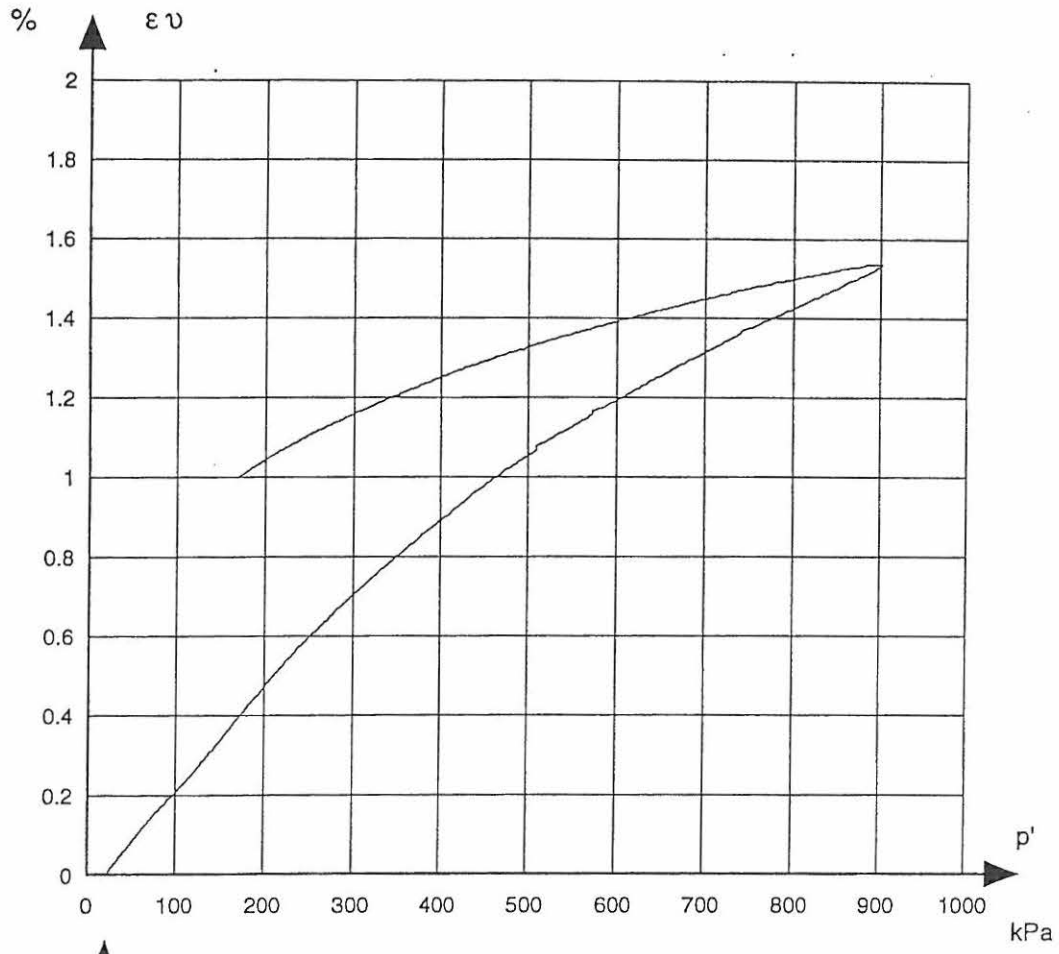
Description of soil			Before test	At failure
Baskarp No 15		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.844	0.824
		Saturation	1.00	
kal7	03-04.10.94	Dimension H mm	71.5	
		D mm	69.8	

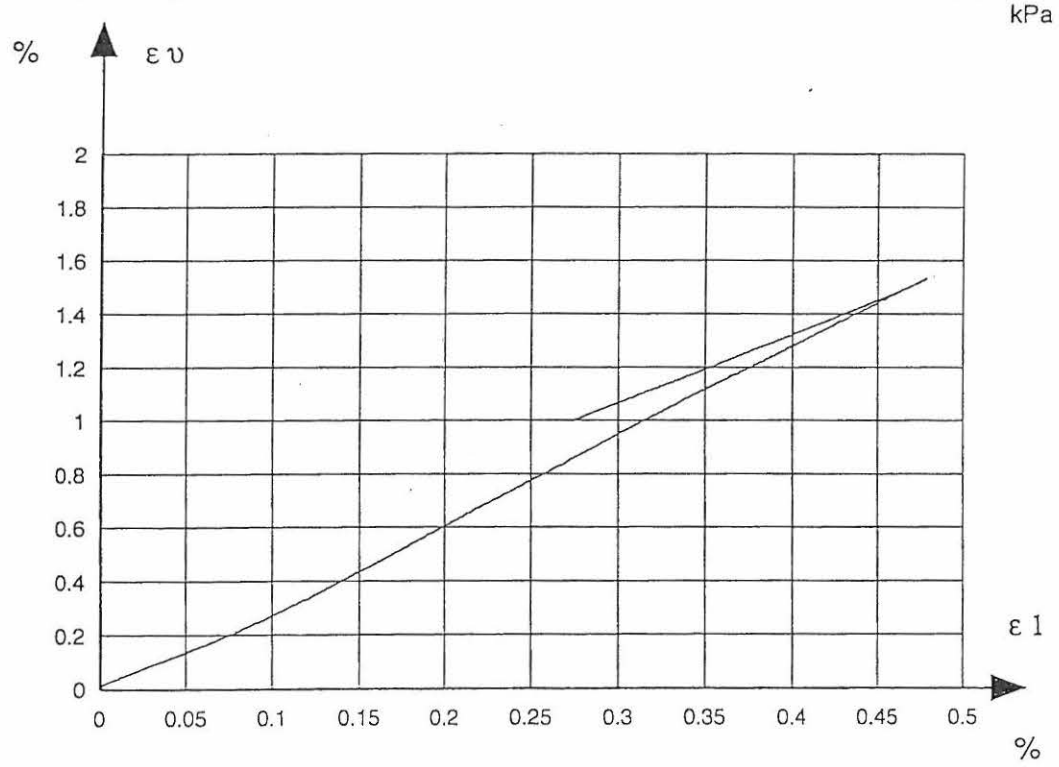
TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-20 kPa
HC - Triaxial test.		ε 1	-0.080 %
free ends		ε v	-0.223 %
	2. Isotropic compression.	q'	0 kPa
		σ3	20-900 kPa
		ε 1	0.5 %
		ε v	1.535 %
	3. Isotropic rebound.	q'	0 kPa
		σ3	900-170 kPa
		ε 1	-0.202 %
		ε v	-0.526 %

Isotropic rebound			
q'	p'	ε 1	ε v
0.00	901.10	0.48	1.54
0.00	874.80	0.48	1.53
0.00	851.10	0.48	1.52
0.00	823.60	0.47	1.51
0.00	800.00	0.47	1.50
0.00	773.70	0.46	1.48
0.00	750.40	0.46	1.47
0.00	725.40	0.45	1.46
0.00	699.60	0.45	1.45
0.00	674.20	0.44	1.43
0.00	649.20	0.44	1.42
0.00	624.20	0.43	1.41
0.00	600.10	0.43	1.39
0.00	575.10	0.42	1.37
0.00	549.90	0.42	1.36
0.00	524.10	0.41	1.34
0.00	500.90	0.40	1.33
0.00	449.60	0.39	1.29
0.00	400.40	0.37	1.25
0.33	349.71	0.36	1.21
0.33	300.21	0.34	1.16
0.33	250.51	0.32	1.11
0.33	219.61	0.30	1.07
0.33	167.01	0.27	1.00

Job:	Encl. No
Baskarp No 15	9
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] $\Delta \varepsilon 1 =$ 0.218



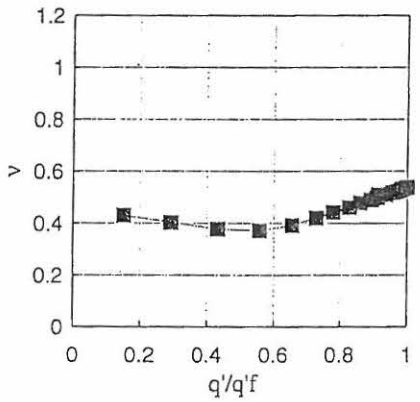


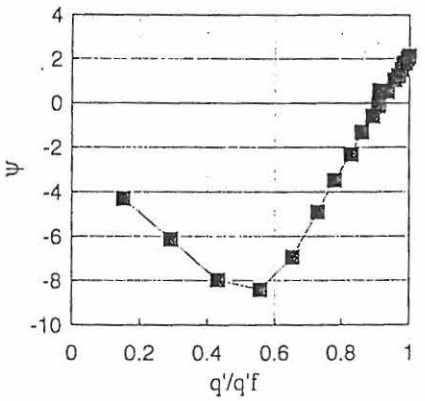
Job: Baskarp No 15	Encl. No 10
Exc:	Check:
MB & JH	MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.846	0.828
		Saturation	1.00	
kal7	04-05.10.94	Dimension H mm	71.5	
		D mm	69.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-985 kPa
CD - Triaxial test.		ε 1	0.459 %
free ends		ε v	1.436 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

		Values at failure		Values for Δε v = 0	
Deviator stress	q'	2220.71	kPa	2021.37	kPa
Mean normal stress	p'	1726.04	kPa	1659.49	kPa
Confining pressures	σ3	985.80	kPa	985.70	kPa
Vertical strain	ε 1	17.61	%	9.82	%
Volumetric strain	ε v	0.91	%	1.32	%

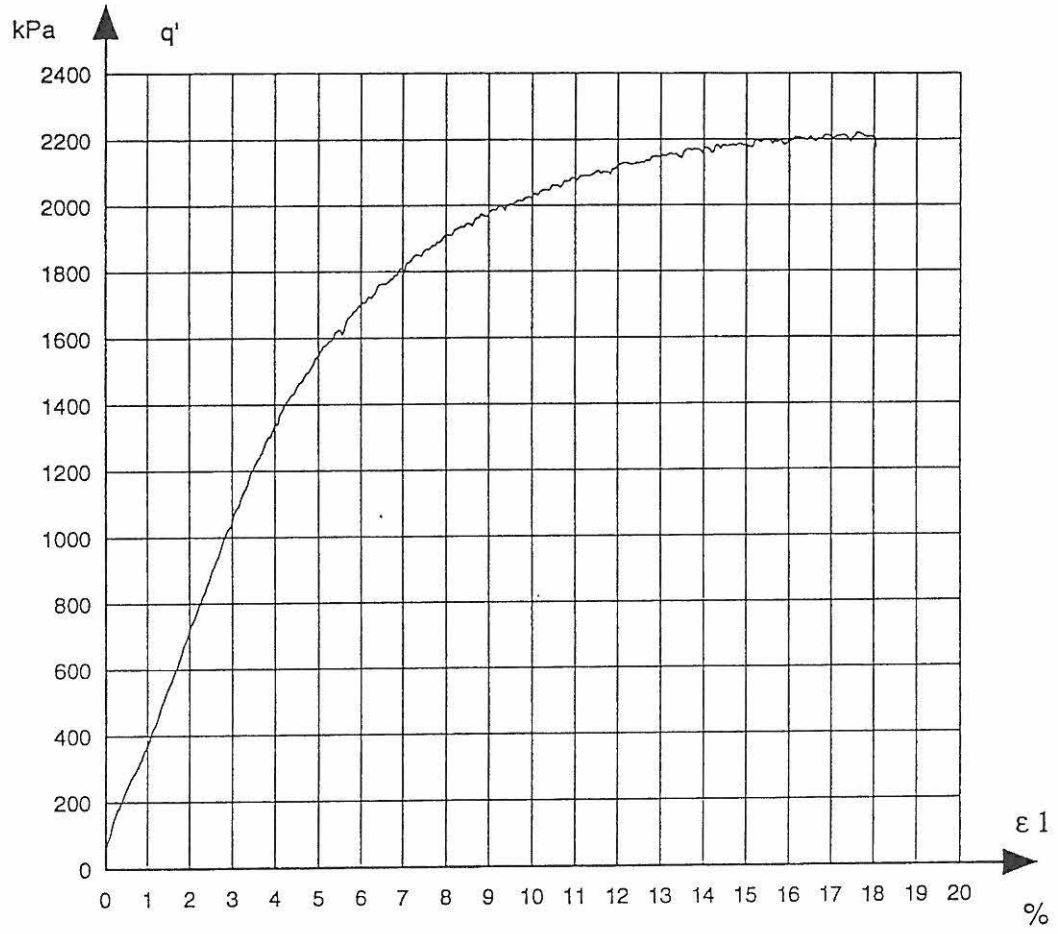


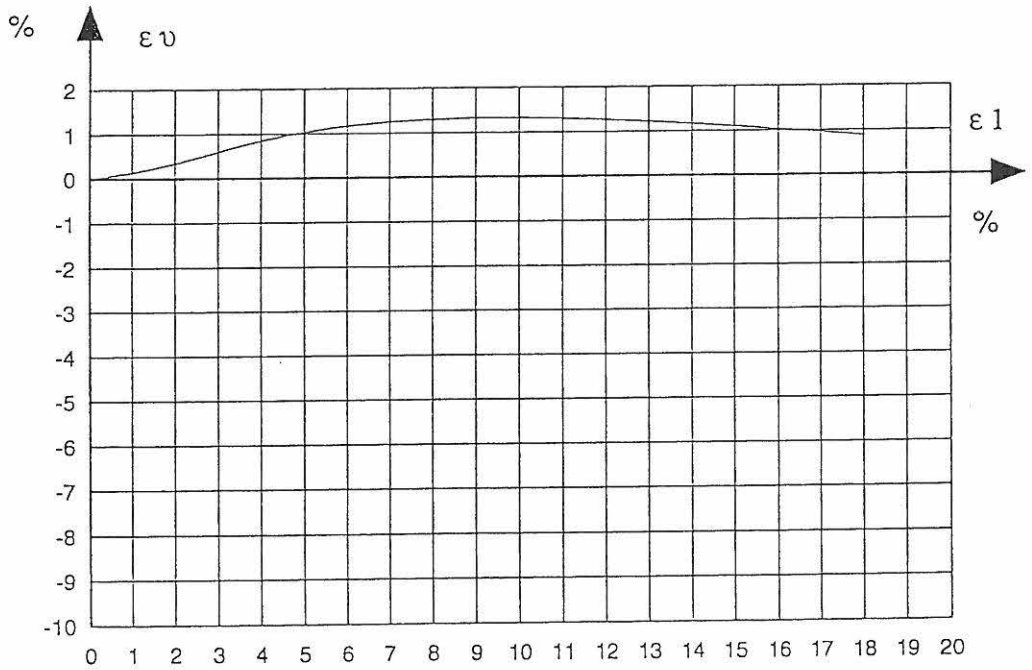


q'	p'	ε 1	ε v
0.33	985.71	0.00	0.00
337.13	1098.18	0.89	0.12
643.99	1200.36	1.81	0.30
956.33	1304.38	2.71	0.52
1235.25	1397.35	3.61	0.75
1452.56	1469.99	4.51	0.94
1618.02	1524.94	5.41	1.09
1728.61	1561.90	6.31	1.19
1837.30	1598.03	7.21	1.26
1907.80	1621.53	8.11	1.30
1979.76	1645.72	9.02	1.32
2016.86	1658.19	9.80	1.32
2021.37	1659.49	9.82	1.32
2025.38	1660.93	10.00	1.32
2076.55	1677.88	11.01	1.30
2121.96	1693.12	12.00	1.26
2149.23	1702.31	13.00	1.22
2169.90	1709.20	13.99	1.16
2182.23	1713.21	15.00	1.10
2194.94	1717.45	16.00	1.03
2208.38	1722.03	17.00	0.96
2220.71	1726.04	17.61	0.91
2205.90	1721.00	18.00	0.88
2172.92	1710.01	18.04	0.88

Job: Baskarp No 15	Encl. No 11
Exc: MB & JH	Check: MB & JH

Remark:
Preparation [%] Δ ε1 = 0.285





Job: Baskarp No 15	Encl. No 12
Exc: MB & JH	Check: MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.843	0.857
		Saturation	1.00	
kal7	06.10.94	Dimension H mm	71.5	
		D mm	69.8	

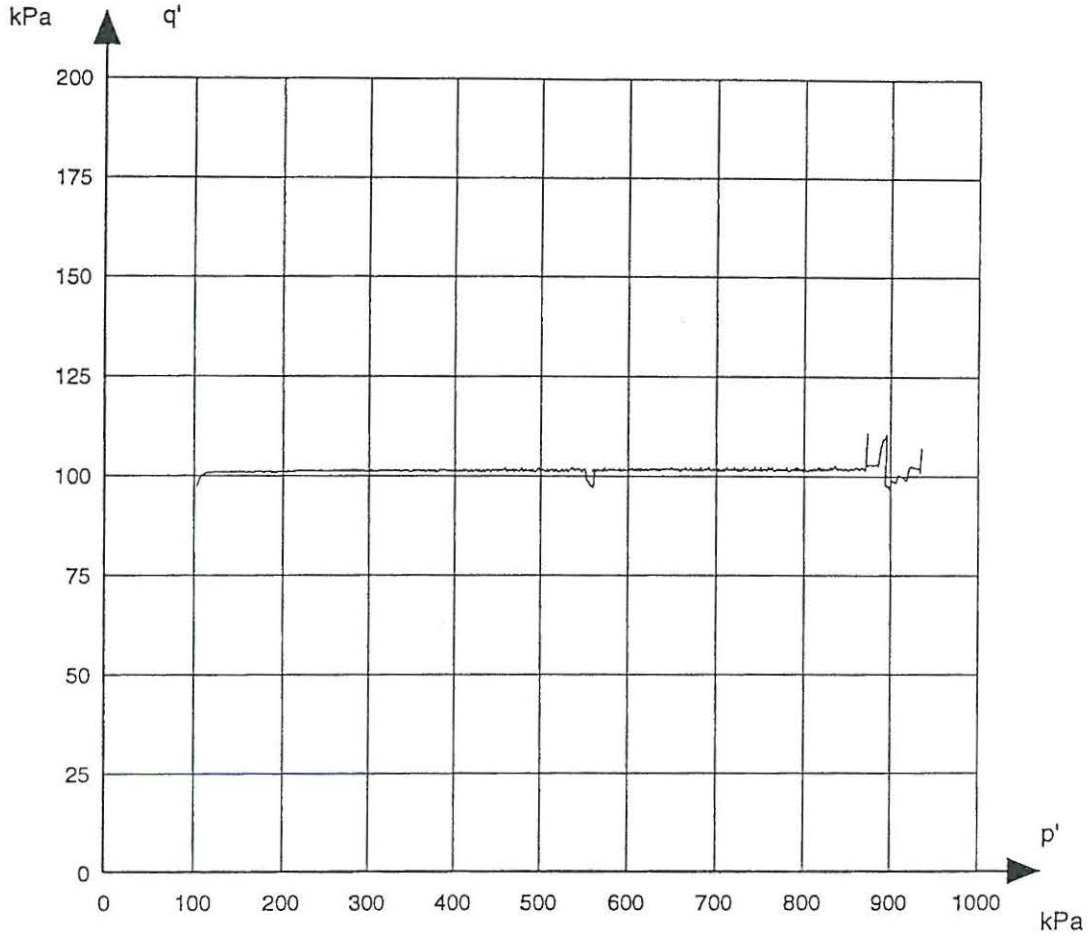
TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-985 kPa
DC - Triaxial test.		ε 1	0.773 %
free ends		ε v	1.425 %
	2.Drained compression.	q'	100 kPa
		p'	930-100 kPa
		ε 1	0.3 %
		ε v	-0.83 %

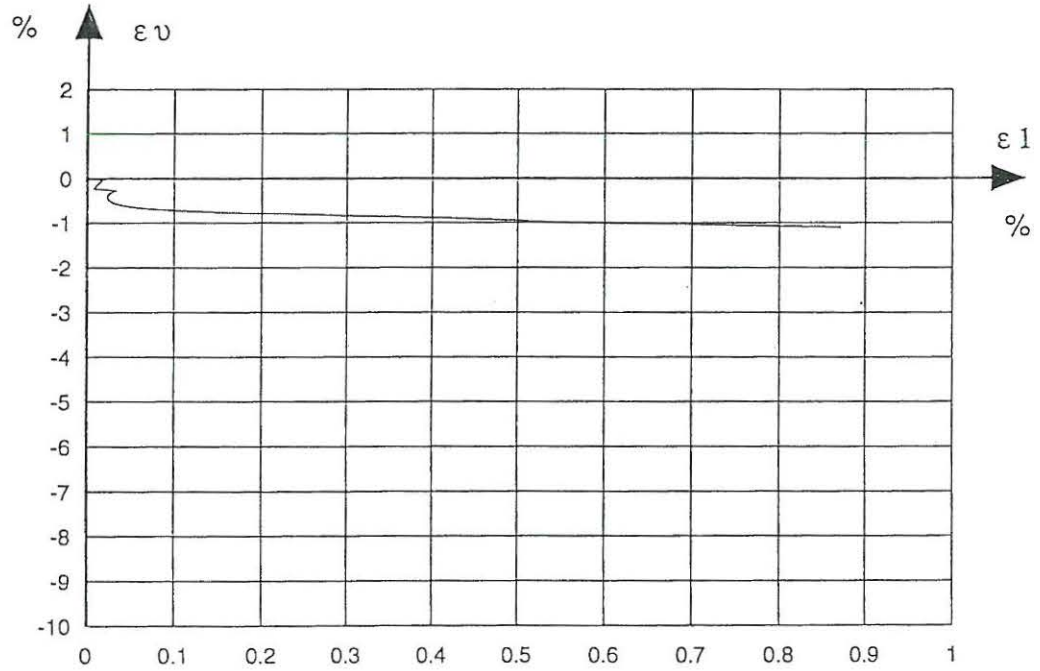
q'	p'	ε 1	ε v
101.13	849.51	0.02	-0.05
102.10	825.53	0.02	-0.06
102.42	801.04	0.02	-0.08
101.09	774.70	0.02	-0.09
101.08	749.49	0.01	-0.11
102.04	725.41	0.01	-0.12
101.37	700.79	0.01	-0.14
102.01	675.20	0.01	-0.16
101.67	650.49	0.01	-0.17
101.98	625.59	0.01	-0.19
101.96	600.29	0.01	-0.21
101.29	575.46	0.01	-0.23
101.87	550.56	0.03	-0.27
100.87	525.72	0.03	-0.29
100.86	499.22	0.03	-0.31
101.17	474.82	0.03	-0.33
100.82	449.41	0.03	-0.35
101.76	401.02	0.02	-0.39
101.05	349.78	0.02	-0.44
101.00	300.47	0.03	-0.49
100.93	249.94	0.03	-0.55
101.17	199.42	0.05	-0.62
101.05	150.48	0.09	-0.70
100.46	109.29	0.24	-0.80

Job: Baskarp No 15	Encl. No 13
Exc: MB & JH	Check: MB & JH

Remark:
Preparation [%] Δ ε1 = 0.258

DC TRIAXIAL TEST NO 9403.08





Job: Baskarp No 15	Encl. No 14
Exc: MB & JH	Check: MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.845	0.852
		Saturation	1.00	
kal10	06-07.10.94	Dimension H mm	71.5	
		D mm	69.8	

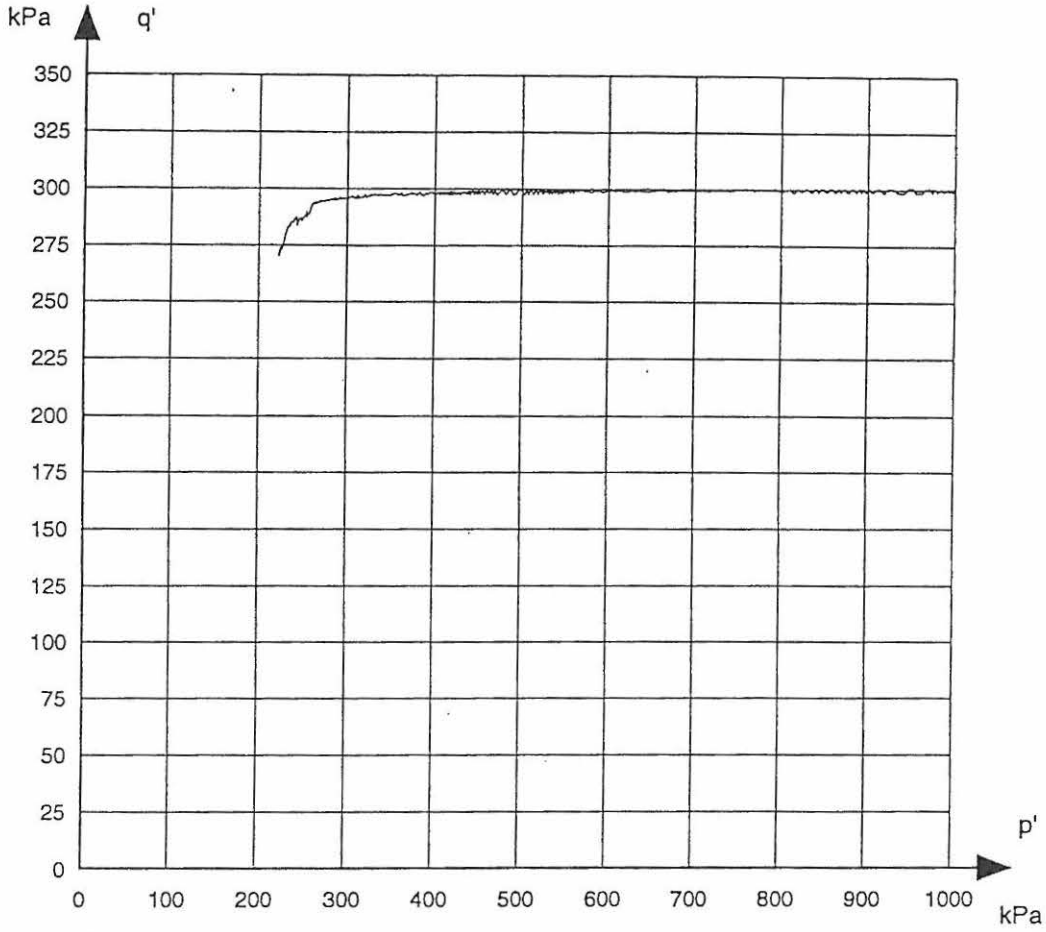
TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-1000 kPa
DC - Triaxial test.		ε 1	1.350 %
free ends		ε v	1.404 %
	2.Drained compression.	q'	300 kPa
		p'	1000-240 kPa
		ε 1	2.4 %
		ε v	-0.53 %

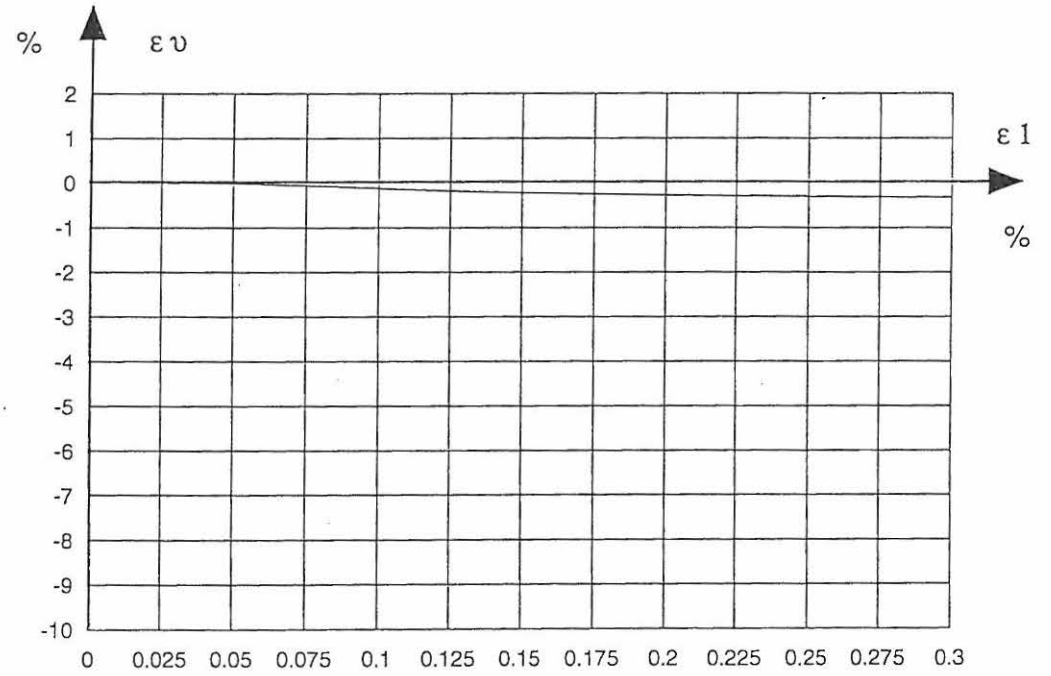
q'	p'	ε 1	ε v
298.81	1000.20	0.01	0.00
300.70	975.53	0.02	-0.01
300.94	950.61	0.04	-0.02
300.55	924.58	0.05	-0.03
300.49	899.86	0.06	-0.04
298.81	874.20	0.07	-0.05
299.08	850.89	0.08	-0.06
299.34	825.18	0.08	-0.08
299.29	800.56	0.09	-0.09
299.88	775.26	0.09	-0.10
299.83	750.24	0.10	-0.11
299.45	725.42	0.10	-0.13
299.07	700.39	0.11	-0.14
299.65	675.48	0.11	-0.16
299.26	650.35	0.12	-0.17
299.19	624.83	0.13	-0.19
299.12	599.71	0.14	-0.20
299.05	574.48	0.15	-0.22
298.32	550.54	0.16	-0.23
299.41	500.10	0.19	-0.26
299.15	450.42	0.24	-0.30
297.83	400.88	0.33	-0.33
296.92	350.77	0.48	-0.37
295.66	300.55	0.86	-0.41

Job: Baskarp No 15	Encl. No 15
Exc: MB & JH	Check: MB & JH

Remark:
Preparation [%] Δ ε1 = 0.287

DC TRIAXIAL TEST NO 9403.09





Job: Baskarp No 15	Encl. No 16
Exc: MB & JH	Check: MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.849	0.839
		Saturation	1.00	
kal10	08.10.94	Dimension H mm	71.5	
		D mm	69.8	

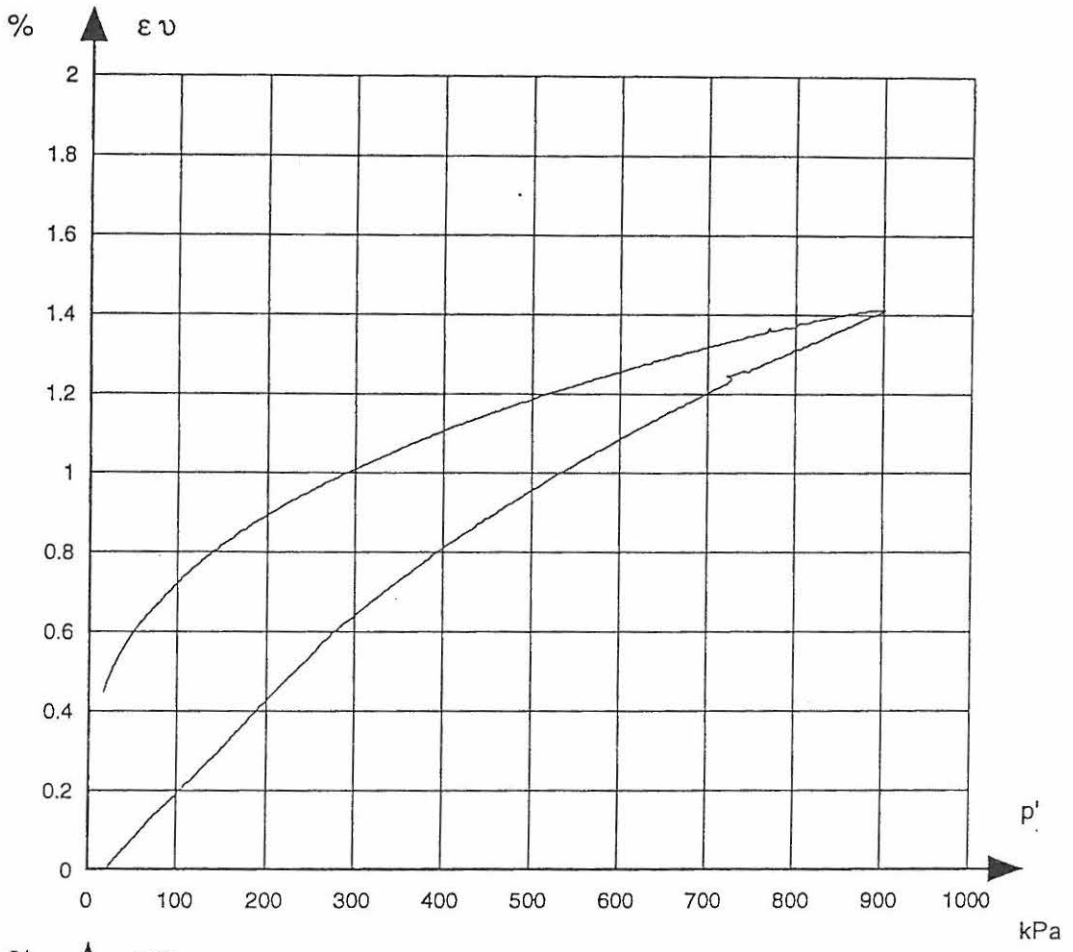
TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-20 kPa
HC - Triaxial test.		ε 1	-0.081 %
free ends		ε v	-0.241 %
	2. Isotropic compression.	q'	0 kPa
		σ3	20-900 kPa
		ε 1	0.5 %
		ε v	1.415 %
	3. Isotropic rebound.	q'	0 kPa
		σ3	900-20 kPa
		ε 1	-0.337 %
		ε v	-0.954 %

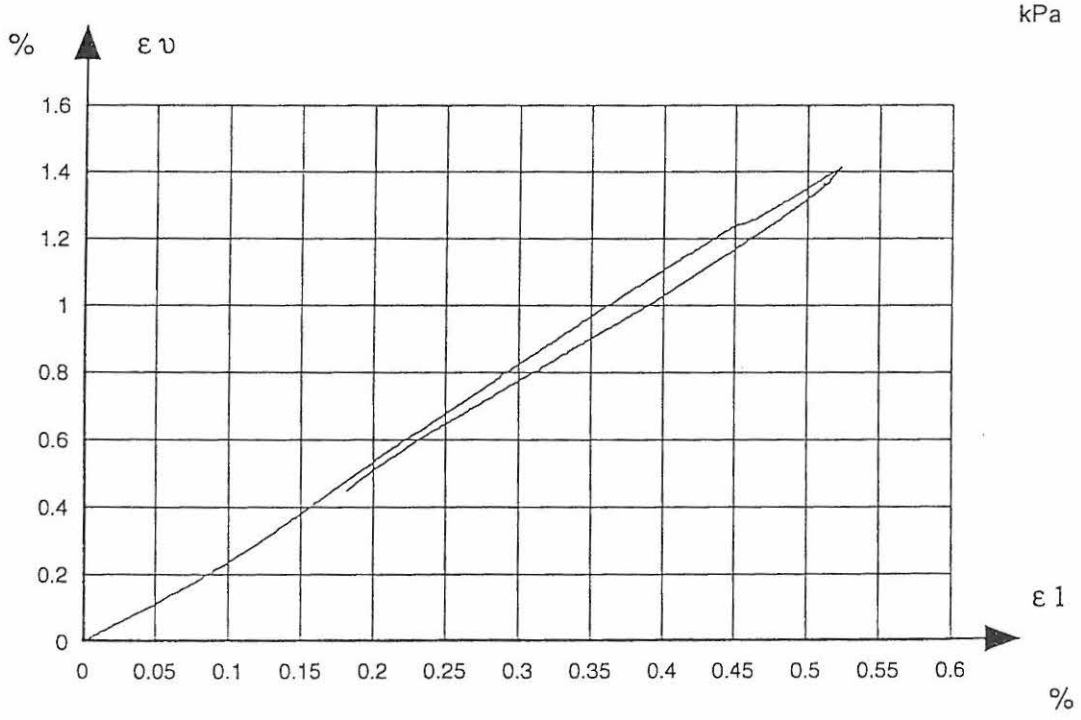
Isotropic rebound			
q'	p'	ε 1	ε v
0.33	901.01	0.52	1.41
0.33	875.11	0.52	1.41
0.33	850.11	0.52	1.40
0.33	824.21	0.52	1.39
0.33	799.01	0.51	1.37
0.33	774.21	0.51	1.36
0.33	749.51	0.51	1.35
0.33	724.81	0.50	1.33
0.33	699.91	0.50	1.32
0.33	675.31	0.50	1.30
0.33	650.01	0.49	1.29
0.33	600.81	0.48	1.25
0.65	549.62	0.47	1.22
0.65	499.32	0.46	1.18
0.65	449.12	0.44	1.15
0.65	400.82	0.43	1.11
0.65	349.42	0.41	1.06
0.65	299.32	0.39	1.01
0.65	249.62	0.37	0.95
0.65	200.22	0.35	0.90
0.65	150.62	0.32	0.82
0.65	99.42	0.28	0.72
0.65	50.12	0.23	0.60
0.65	19.72	0.19	0.46

Job: Baskarp No 15	Encl. No 17
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = 0.197

HC TRIAXIAL TEST NO 9403.10





Job: Baskarp No 15	Encl. No 18
Exc: MB & JH	Check: MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.845	0.846
		Saturation	1.00	
kal10	09.10.94	Dimension H mm	71.5	
		D mm	69.8	

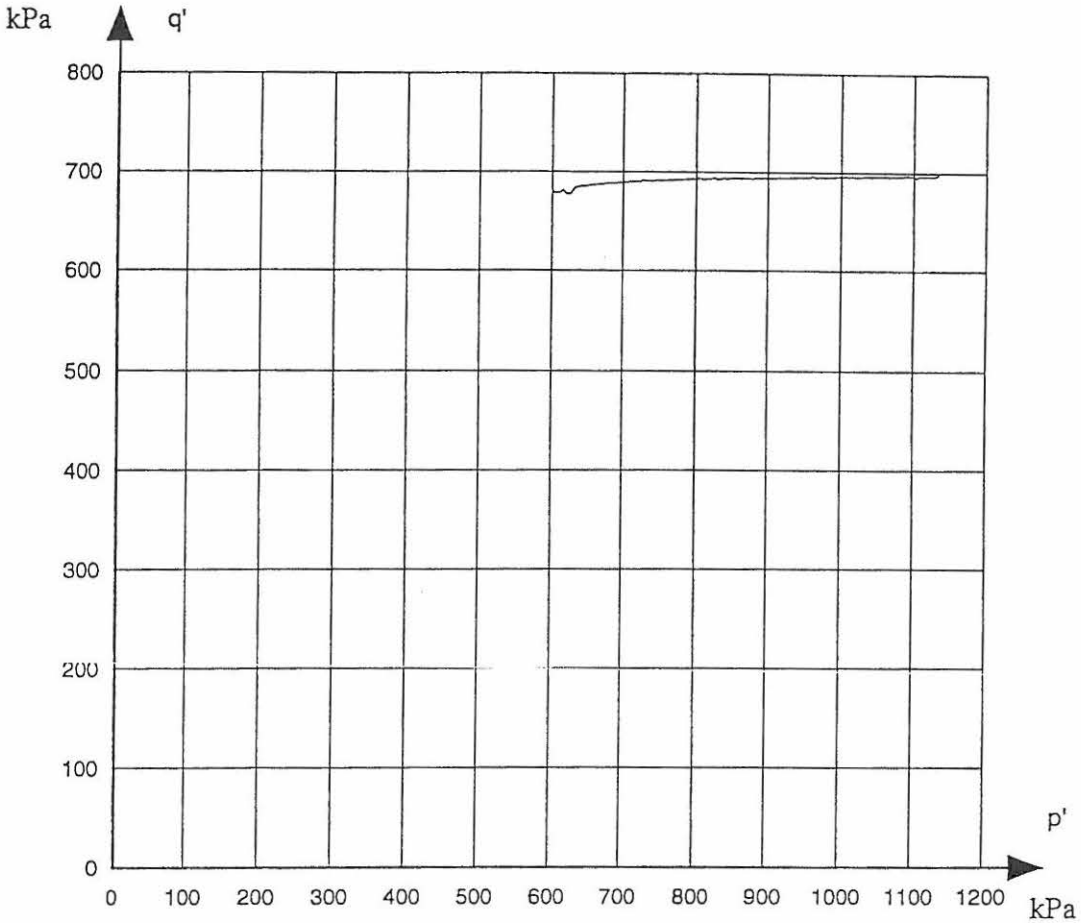
TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-985 kPa
DC - Triaxial test.		ε 1	2.268 %
free ends		ε v	1.831 %
	2.Drained compression.	q'	700 kPa
		p'	1130-600 kPa
		ε 1	1.9 %
		ε v	-0.15 %

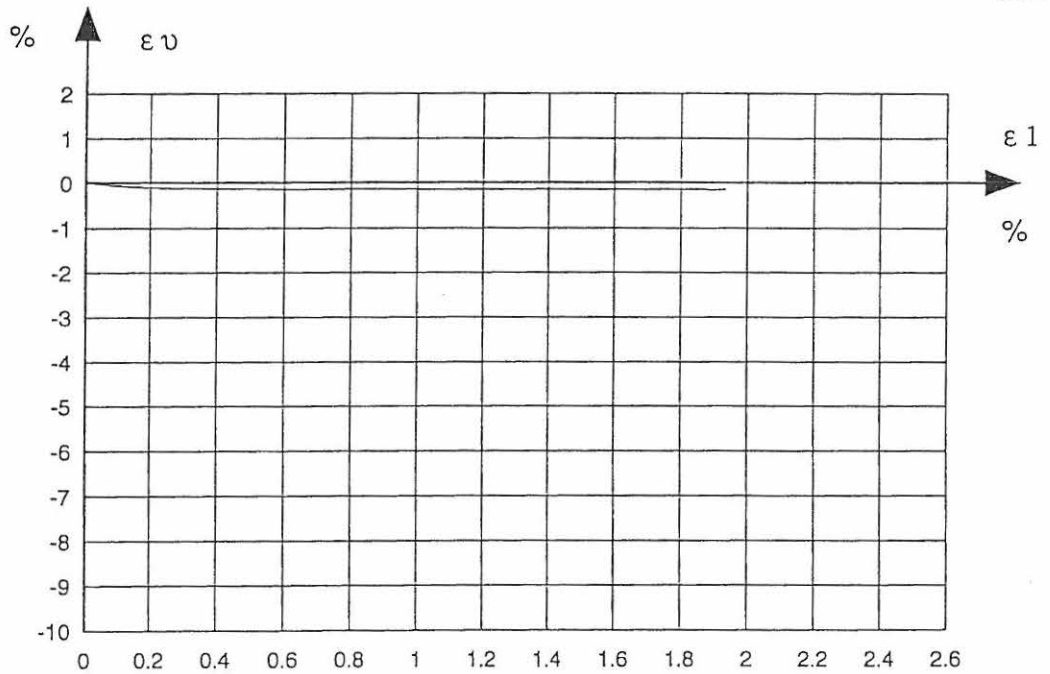
q'	p'	ε 1	ε v
696.38	1125.63	0.01	0.00
696.26	1110.19	0.01	-0.01
695.88	1099.86	0.02	-0.01
696.73	1084.84	0.03	-0.01
695.70	1074.80	0.03	-0.02
695.94	1060.58	0.04	-0.03
695.85	1049.75	0.05	-0.03
695.74	1036.01	0.06	-0.04
696.00	1024.80	0.06	-0.04
695.23	1009.74	0.07	-0.05
695.48	1000.73	0.08	-0.05
695.01	985.17	0.09	-0.06
695.25	974.75	0.10	-0.07
695.41	959.60	0.12	-0.07
695.33	950.88	0.12	-0.08
694.10	924.77	0.15	-0.08
694.44	899.88	0.18	-0.10
693.50	875.57	0.21	-0.11
694.44	849.68	0.26	-0.11
693.70	824.53	0.31	-0.12
693.51	800.07	0.37	-0.13
691.61	774.54	0.45	-0.13
691.26	750.62	0.55	-0.14
690.74	725.75	0.66	-0.14

Job: Baskarp No 15	Encl. No 19
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = -0.054

DC TRIAXIAL TEST NO 9403.11



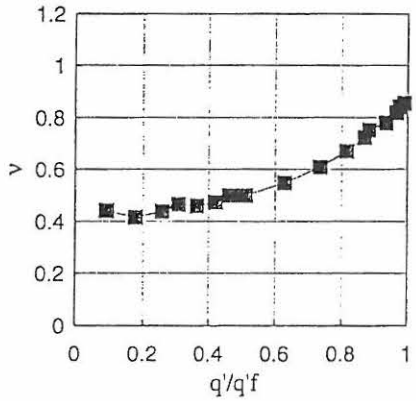


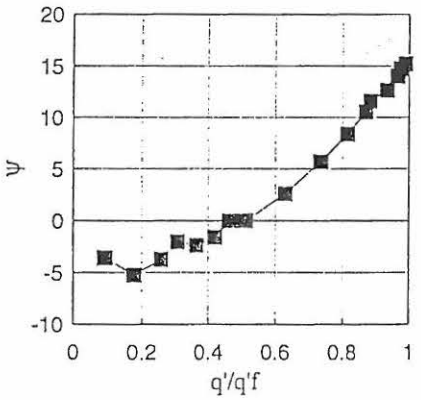
Job: Baskarp No 15	Encl. No 20
Exc: MB & JH	Check: MB & JH

Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.606	0.656
		Saturation	1.05	
kaht2c	03.11.94	Dimension H mm	71.5	
		D mm	69.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-160 kPa
CD - Triaxial test.		ε 1	0.051 %
free ends		ε v	0.128 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

		Values at failure		Values for Δε v = 0	
Deviator stress	q'	635.18	kPa	323.53	kPa
Mean normal stress	p'	372.23	kPa	268.24	kPa
Confining pressures	σ3	160.50	kPa	160.40	kPa
Vertical strain	ε 1	7.06	%	1.01	%
Volumetric strain	ε v	-3.17	%	0.08	%

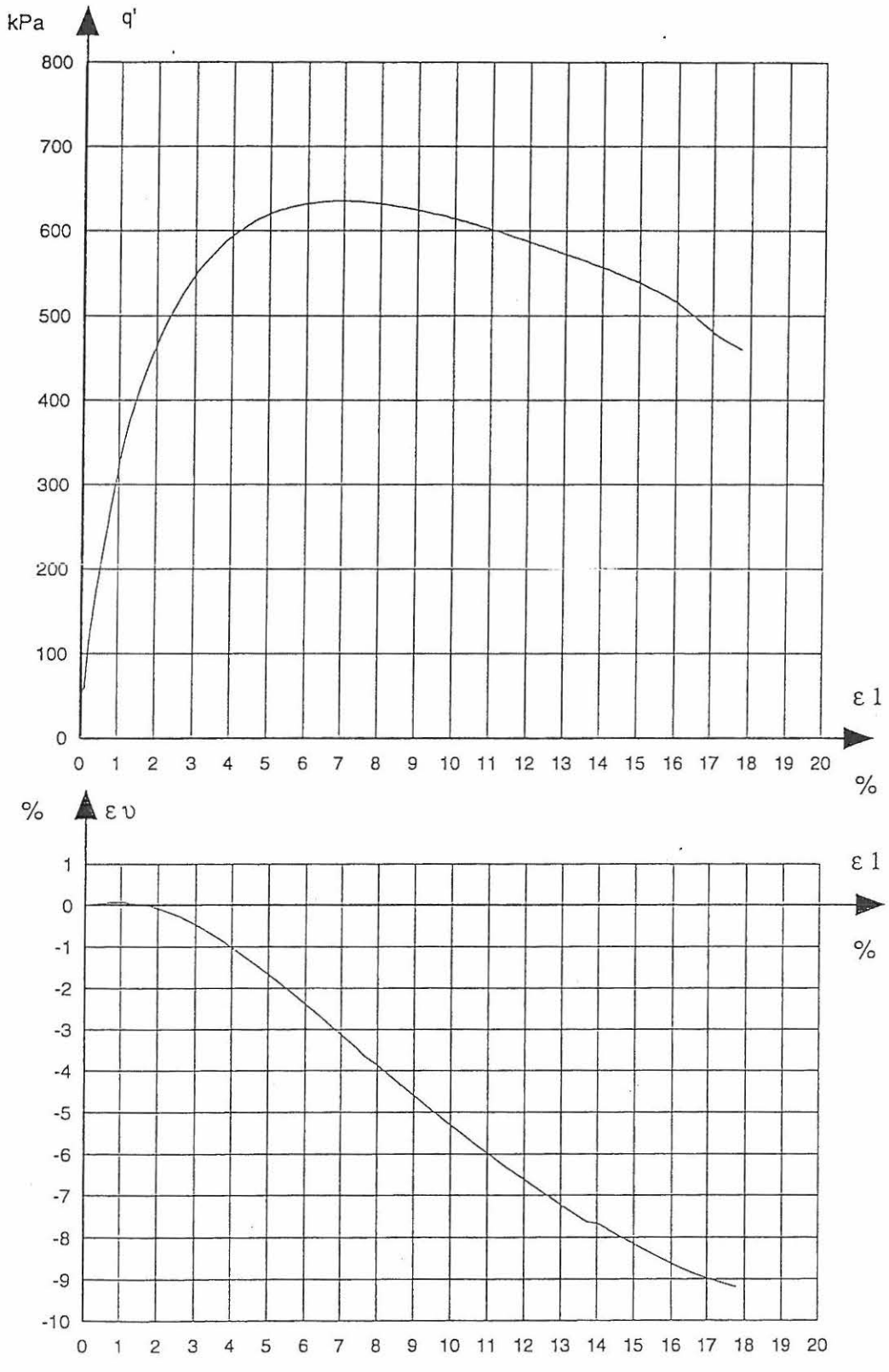




q'	p'	ε 1	ε v
0.19	160.36	0.00	0.00
58.23	179.71	0.12	0.01
112.18	197.69	0.23	0.03
162.75	214.55	0.38	0.05
193.97	224.96	0.49	0.06
230.36	237.09	0.63	0.07
265.51	248.80	0.76	0.08
292.15	257.78	0.87	0.08
304.61	261.94	0.92	0.08
323.53	268.24	1.01	0.08
398.98	293.49	1.47	0.03
466.72	316.17	2.02	-0.09
517.13	332.88	2.57	-0.27
552.22	344.57	3.08	-0.50
560.92	347.47	3.24	-0.58
593.06	358.19	3.97	-0.99
613.15	364.88	4.68	-1.45
619.63	367.04	4.98	-1.65
628.05	369.85	5.58	-2.08
632.26	371.25	6.05	-2.42
634.49	372.00	6.48	-2.73
635.18	372.23	7.06	-3.17
632.02	371.17	8.00	-3.86
623.92	368.47	9.07	-4.65

Job: Baskarp No 15	Encl. No 21
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = 0.191



Job: Baskarp No 15	Encl. No 22
Exc: MB & JH	Check: MB & JH

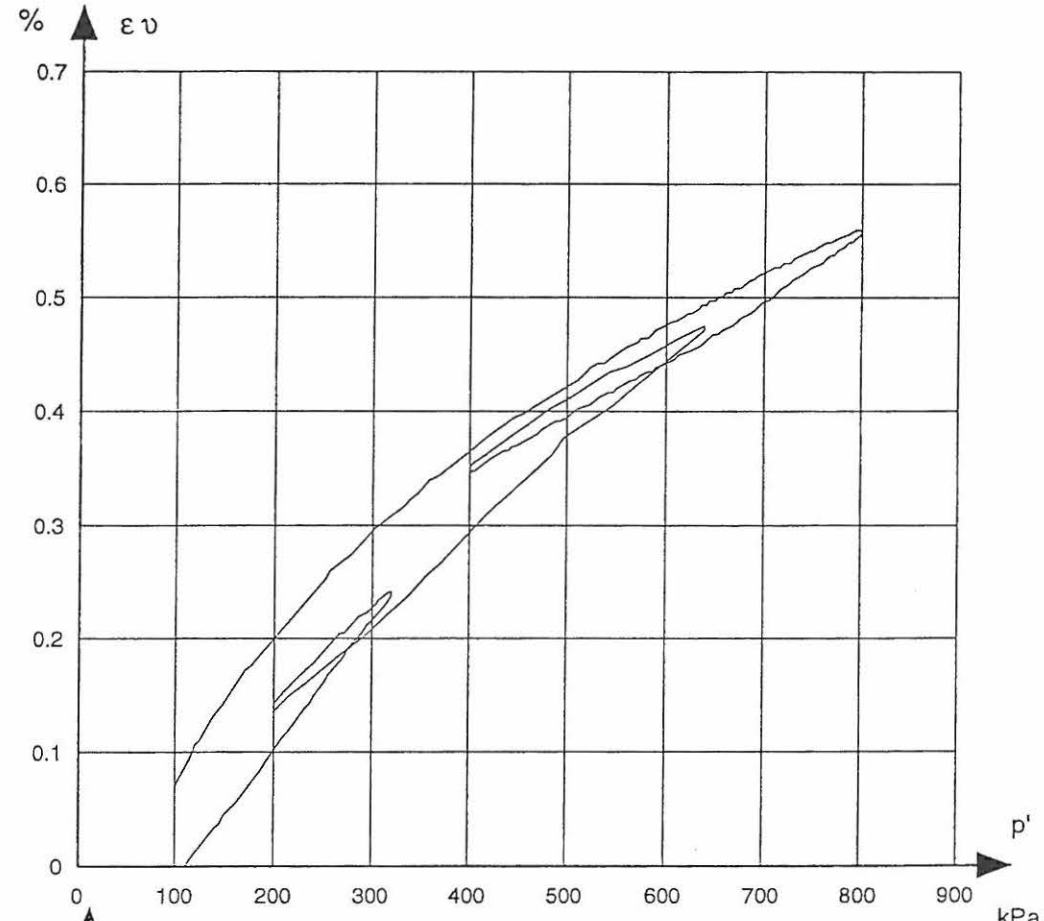
Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.614	0.612
		Saturation	1.10	
kaht2c	03-04.11.94	Dimension H mm	71.5	
		D mm	69.8	

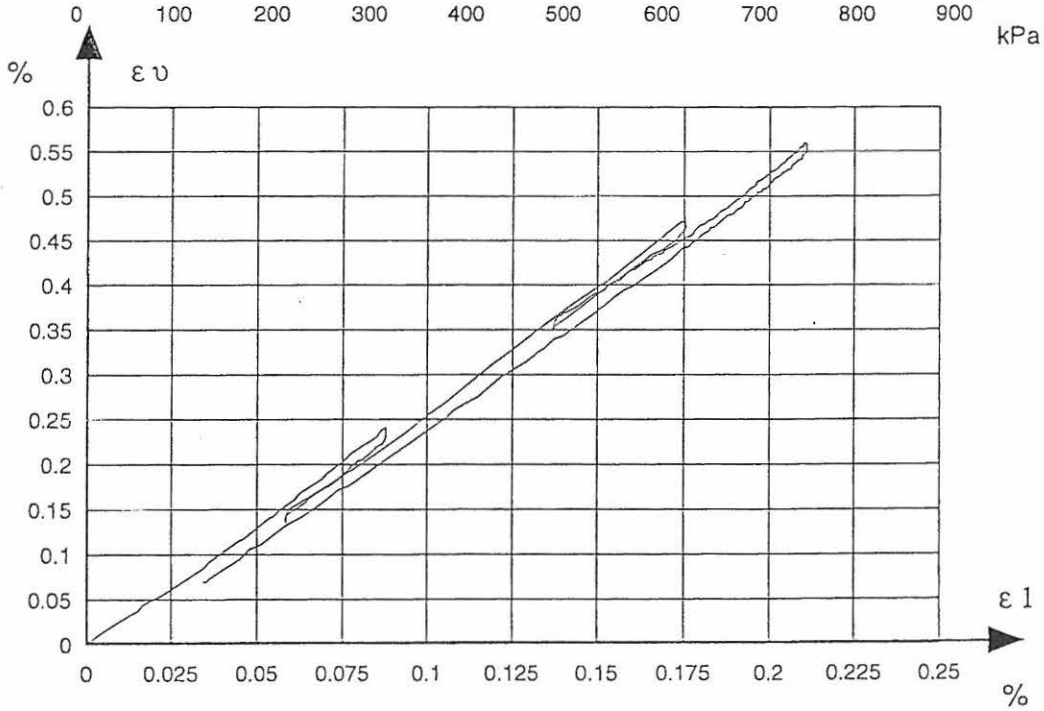
TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-320 kPa
HC - Triaxial test.		ε 1	0.086 %
free ends		ε v	0.238 %
	2. Isotropic rebound.	σ3	320-200 kPa
		ε 1	-0.028 %
		ε v	-0.095 %
	3. Isotropic compression.	σ3	200-640 kPa
		ε 1	0.116 %
		ε v	0.329 %
	4. Isotropic rebound.	σ3	640-400 kPa
		ε 1	-0.037 %
		ε v	-0.121 %
	5. Isotropic compression.	σ3	400-800 kPa
		ε 1	0.073 %
		ε v	0.205 %
	6. Isotropic rebound.	σ3	800-100 kPa
		ε 1	-0.175 %
		ε v	-0.487 %

6. Isotropic rebound			
q'	p'	ε 1	ε v
-1.71	799.33	0.21	0.56
-1.71	716.13	0.20	0.53
-1.52	650.59	0.19	0.50
-1.33	581.66	0.18	0.46
-1.14	520.42	0.17	0.43
-1.14	461.72	0.16	0.40
-0.95	416.88	0.15	0.38
-0.95	368.48	0.14	0.34
-0.76	329.45	0.13	0.31
-0.76	289.75	0.12	0.29
-0.57	251.71	0.11	0.25
-0.38	176.07	0.08	0.18
-0.38	159.57	0.07	0.16
-0.38	138.67	0.06	0.13
-0.19	119.94	0.05	0.11
-0.19	101.44	0.04	0.07
-0.19	100.44	0.03	0.07

Job: Baskarp No 15	Encl. No 23
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] $\Delta \varepsilon 1 =$ 0.049





Job: Baskarp No 15	Encl. No 24
Exc:	Check:
MB & JH	MB & JH

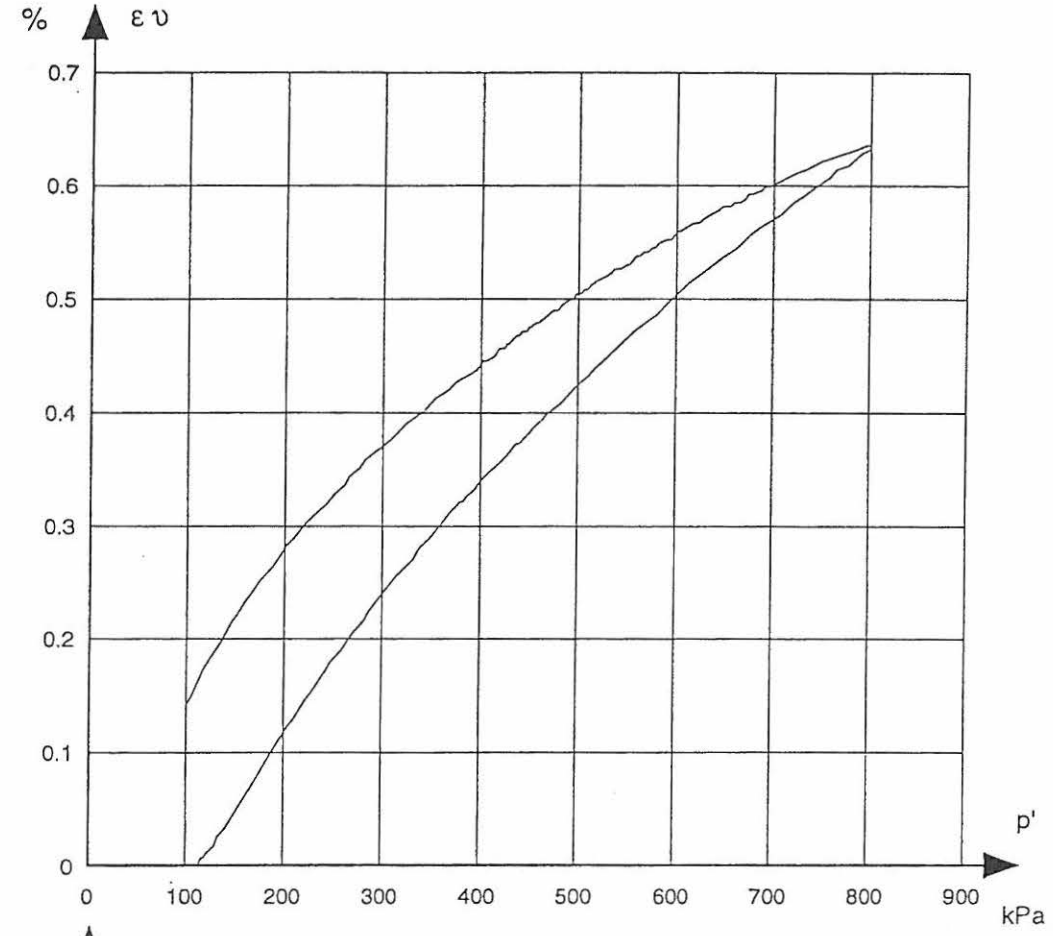
Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.607	0.604
		Saturation	1.05	
kal10	04.11.94	Dimension H mm	71.5	
		D mm	69.8	

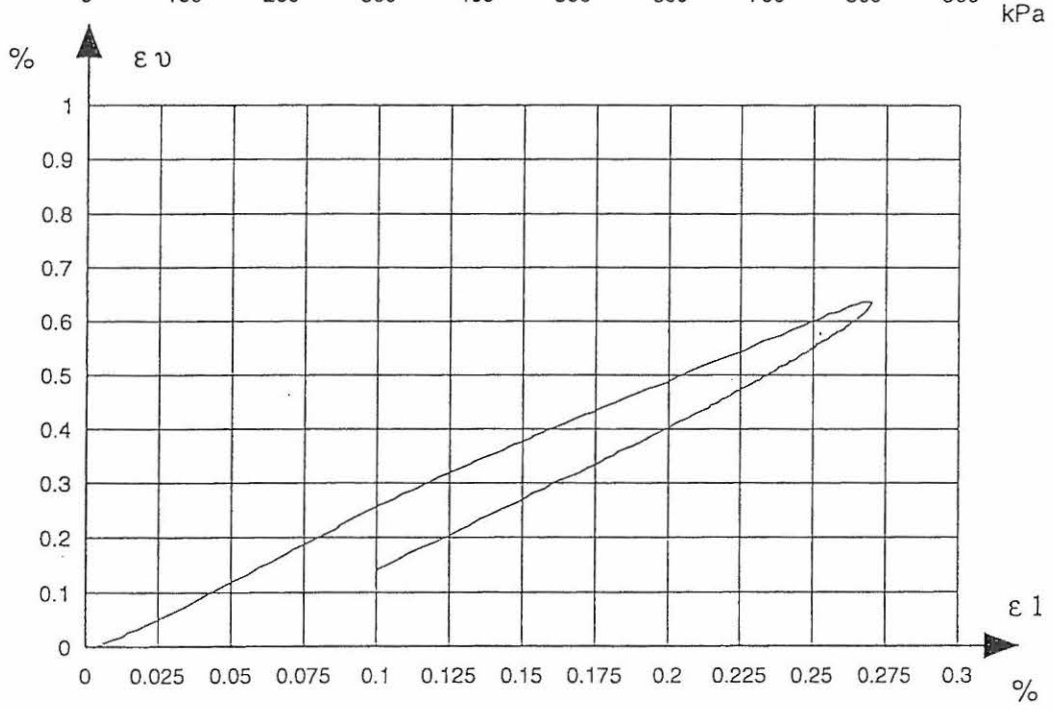
TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-800 kPa
HC - Triaxial test.		ε 1	0.265 %
free ends		ε v	0.632 %
	2. Isotropic rebound.	σ3	800-100 kPa
		ε 1	-0.165 %
		ε v	-0.489 %

Isotropic rebound			
q'	p'	ε 1	ε v
-1.71	799.23	0.27	0.63
-1.71	721.63	0.27	0.61
-1.52	671.29	0.26	0.59
-1.52	622.89	0.26	0.57
-1.33	577.66	0.25	0.54
-1.33	542.46	0.24	0.53
-1.14	502.72	0.24	0.50
-1.14	464.12	0.23	0.48
-0.95	428.28	0.22	0.46
-0.95	399.28	0.21	0.44
-0.95	367.38	0.21	0.42
-0.76	330.45	0.20	0.39
-0.76	308.15	0.19	0.38
-0.76	281.25	0.18	0.36
-0.57	260.71	0.18	0.34
-0.57	235.71	0.17	0.31
-0.38	208.57	0.16	0.29
-0.38	195.87	0.15	0.27
-0.38	163.97	0.14	0.24
-0.38	160.57	0.14	0.23
-0.19	139.74	0.13	0.20
-0.19	127.14	0.12	0.19
-0.19	110.94	0.11	0.16
-0.19	100.24	0.10	0.14

Job: Baskarp No 15	Encl. No 25
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = 0.049





Job: Baskarp No 15	Encl. No 26
Exc: MB & JH	Check: MB & JH

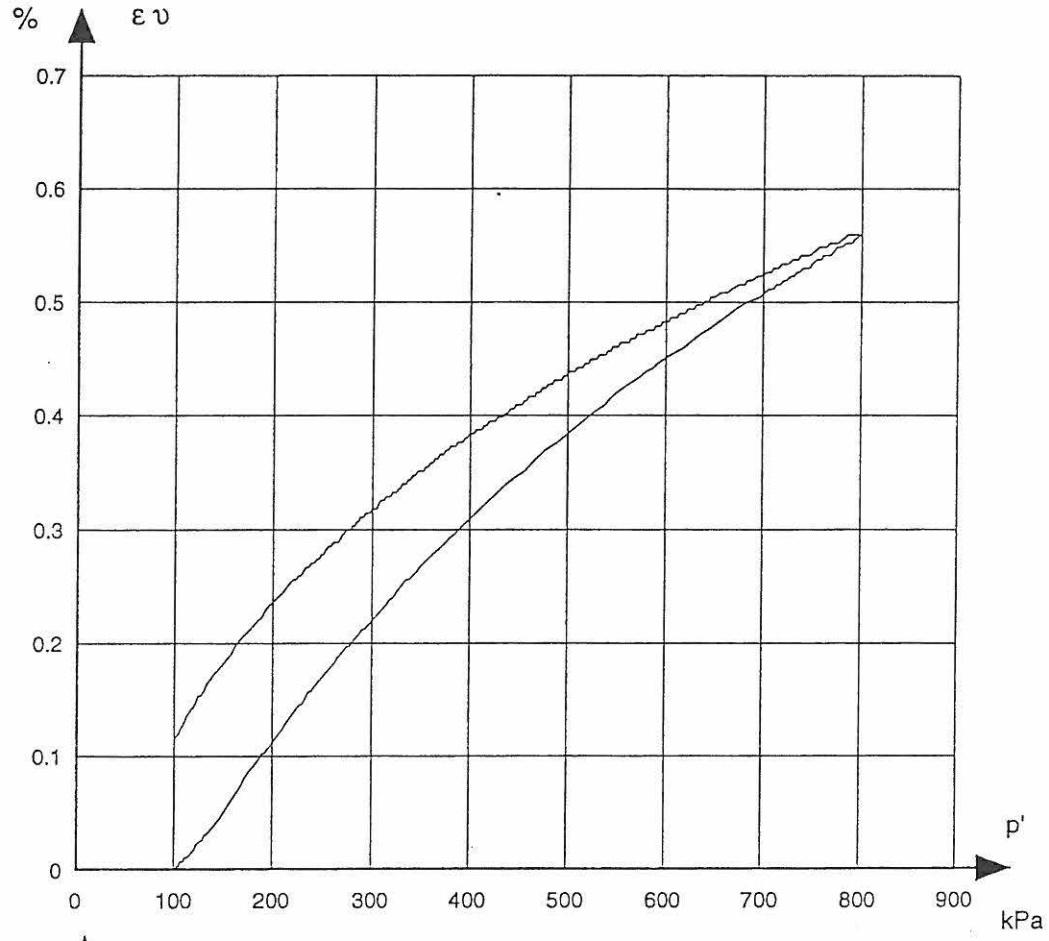
Description of soil Baskarp No 15			Before test	At failure
		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.608	0.602
		Saturation	1.03	
kaht2c	05.11.94	Dimension H mm	71.5	
		D mm	69.8	

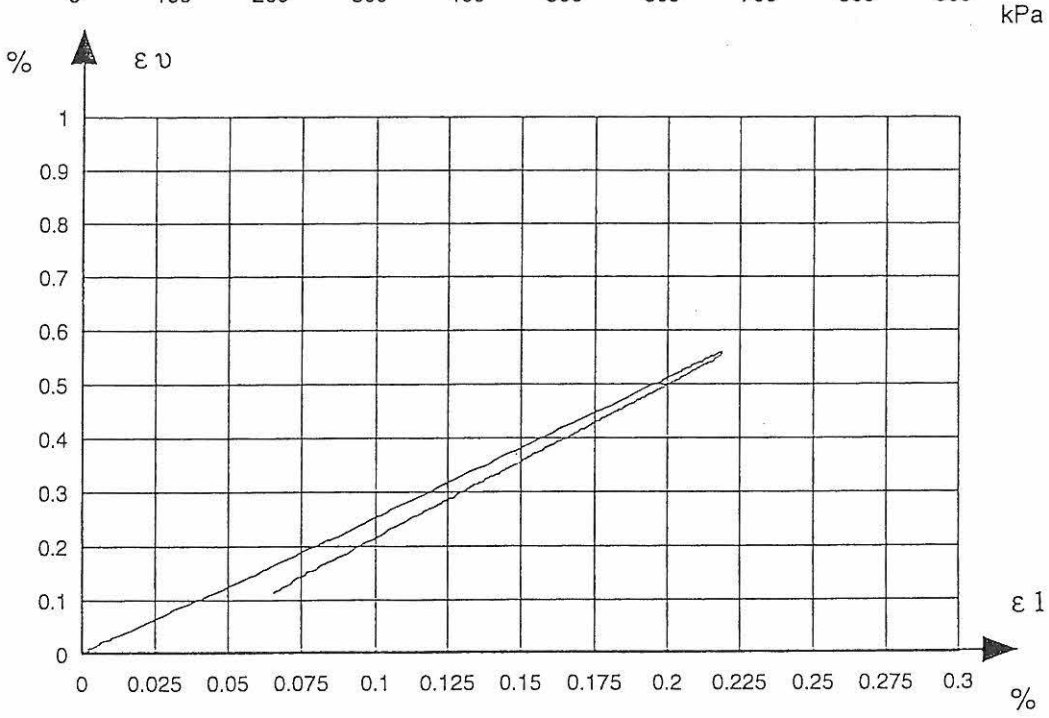
TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-800 kPa
HC - Triaxial test.		ε 1	0.218 %
fixed ends		ε v	0.558 %
	2. Isotropic rebound.	σ3	800-100 kPa
		ε 1	-0.153 %
		ε v	-0.445 %

Isotropic rebound			
q'	p'	ε 1	ε v
-1.52	799.59	0.22	0.56
-1.52	747.09	0.22	0.54
-1.33	688.26	0.21	0.52
-1.33	644.66	0.20	0.50
-1.33	602.96	0.19	0.48
-1.14	550.92	0.19	0.46
-0.95	516.98	0.18	0.45
-0.95	473.98	0.17	0.42
-0.95	441.08	0.17	0.41
-0.76	398.95	0.16	0.38
-0.76	369.85	0.15	0.37
-0.57	342.51	0.15	0.35
-0.57	308.01	0.14	0.33
-0.57	284.01	0.13	0.31
-0.38	261.07	0.13	0.29
-0.38	236.07	0.12	0.27
-0.38	213.67	0.11	0.25
-0.19	193.54	0.10	0.23
-0.19	177.04	0.10	0.21
-0.19	157.64	0.09	0.19
-0.19	139.94	0.08	0.17
-0.19	126.94	0.08	0.15
0.00	111.20	0.07	0.13
0.00	100.40	0.07	0.11

Job: Baskarp No 15	Encl. No 27
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = -0.007



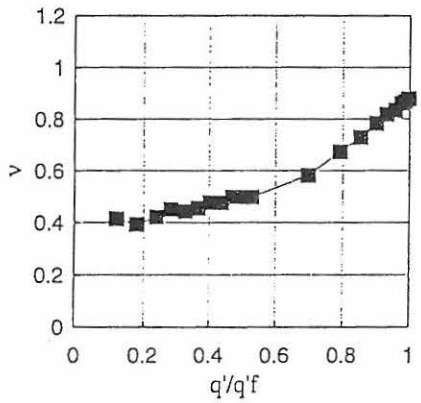


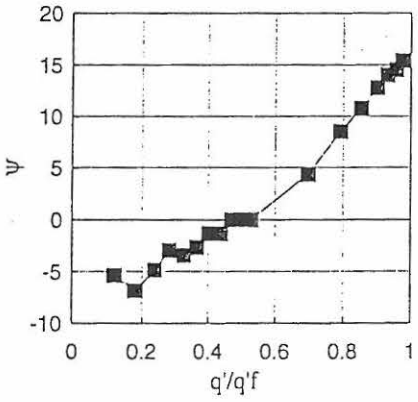
Job: Baskarp No 15	Encl. No 28
Exc: MB & JH	Check: MB & JH

Description of soil			Before test	At failure
Baskarp No 15		Water content %	-	
		Grain density	2.64	
Calibration file	Date	Void ratio	0.608	0.660
		Saturation	1.01	
kaht2c	05.11.94	Dimension H mm	71.5	
		D mm	69.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-100 kPa
CD - Triaxial test.		ε 1	-0.000 %
free ends		ε v	0.000 %
	2. Drained compression.		
	Deformation rate:		4.0 % ph

		Values at failure		Values for Δε v = 0	
Deviator stress	q'	400.85	kPa	211.85	kPa
Mean normal stress	p'	233.92	kPa	170.92	kPa
Confining pressures	σ3	100.30	kPa	100.30	kPa
Vertical strain	ε 1	6.53	%	0.91	%
Volumetric strain	ε v	-3.26	%	0.08	%

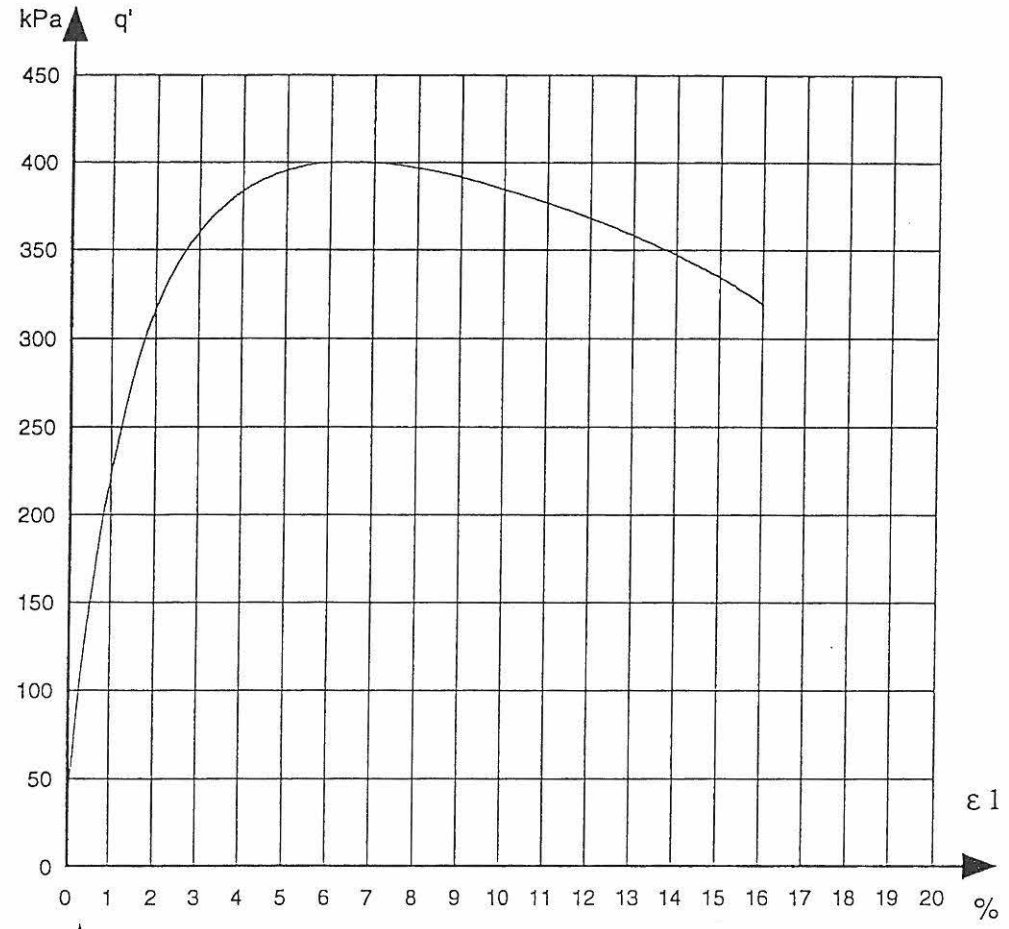


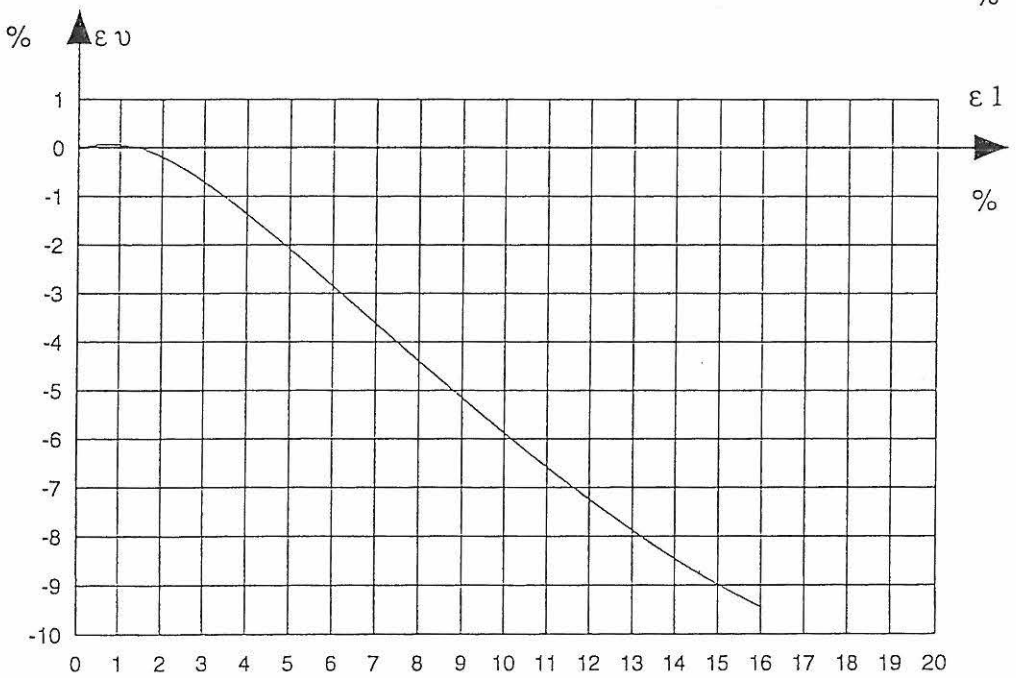


q'	p'	ε 1	ε v
0.19	100.86	0.00	0.00
48.73	116.44	0.09	0.01
72.01	124.10	0.15	0.03
95.62	131.97	0.25	0.04
112.96	137.75	0.32	0.05
131.20	143.83	0.42	0.06
146.59	149.06	0.50	0.07
160.64	153.65	0.58	0.07
174.66	158.32	0.66	0.08
187.71	162.77	0.74	0.08
199.98	166.86	0.83	0.08
211.85	170.92	0.91	0.08
279.49	193.56	1.51	-0.02
317.29	206.16	2.01	-0.20
341.92	214.37	2.50	-0.42
360.83	220.68	3.02	-0.72
373.21	224.80	3.49	-1.02
383.62	228.27	4.01	-1.36
390.95	230.62	4.51	-1.73
395.41	232.20	5.01	-2.10
398.61	233.17	5.50	-2.47
400.07	233.76	6.02	-2.87
400.85	233.92	6.53	-3.26
398.52	233.24	7.50	-4.02

Job:	Encl. No
Baskarp No 15	29
Exc:	Check:
MB & JH	MB & JH

Remark:
Preparation [%] Δ ε1 = 0.031





Job: Baskarp No 15	Encl. No 30
Exc: MB & JH	Check: MB & JH